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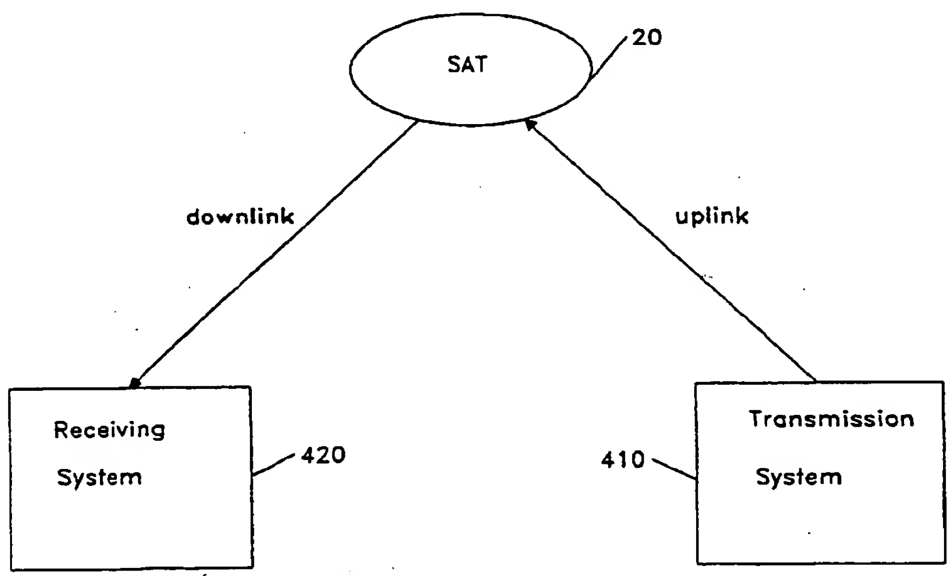

(57) Abstract

A transmission and receiving system (410, 420) can transmit information such as an audio/video signal of broadcast quality or file information via satellite (20) from and to anywhere in the world (except the polar caps) in real time. This portable satellite communications system is housed in an easy to set up, take down and transport arrangement housing which also protects it from weather and other damaging forces while maintaining its light weight. An information distribution system for a digital network includes a master communications unit, communications units for establishing communications with a plurality of receiving stations, a master controller for controlling the plurality of communications units from a central location, a menu unit accessible from the digital network for storing information indicating the subject matter associated with and how-to-access each of the plurality of video clip storing units. A mobile microwave system can transmit and receive broadcast quality video signals while in motion.

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GLOBAL VIDEO COMMUNICATIONS SYSTEMS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to an apparatus and method for transmitting information from one location to another and in particular to a portable satellite communications system capable of digitizing, compressing and transmitting video information from a first location, and receiving, decompressing and viewing the video signal at a second location. This portable satellite communications system has a housing which houses and protects the satellite communications system in an easy to set up, take down and transport arrangement and protects the system from weather damage such as rain as well as from bumps, jolts and other damaging forces while maintaining a light weight system.

This invention also relates generally to a global satellite communications vehicle capable of receiving and forwarding information including video and other sensor information from a remote location in real time even while the vehicle is moving.

The invention also relates to a global digital news distribution system for transmitting digital news clips and/or digitized photographs for printing simultaneously from one or more locations anywhere in the world to one or more locations anywhere in the world.

2. Description of Related Art

A news team frequently has to transmit a video clip of a news story at some remote location site back to a home television station. Typically, the news team accomplishes this by either using their own earth station with a satellite dish and uplink electronics or renting such an earth station from a third party. Often, however, the television station cannot afford such an earth station or none is available from a third party and consequently the news team must rely on a nearby government ministry-owned satellite earth station.

Figure 1A shows a truck 10 with a satellite dish 16 which together serve as a point-of-origin independent earth station 14. In order to be point-of-origin independent, earth station 14 must

use the C or Ku-band and, consequently, the diameter of the dish 16 must be at least 10 to 15 meters. Truck 10 contains all uplink electronics required to transmit microwave signals in the C or Ku band. A video signal is modulated onto a microwave signal and then is amplified and transmitted to a satellite 20 typically owned by some government agency. That government agency is not necessarily associated with the country in which the earth station is located. The microwave signal is then downlinked to another large microwave dish 24 at television station 28 where it can be broadcast live to a surrounding area or taped for broadcast at a later time. Alternatively, local television station 28 can retransmit the video clip from dish 24 to another television station 29 having its own dish 30 with a diameter of about 8-12 feet (Figure 1B). A local television station can then rebroadcast the video clip to its local viewers.

This process has a variety of drawbacks. For example, earth station 14 is very large, heavy and has expensive uplink electronics. Also, earth station 14 can weigh several tons and consequently shipping such a system itself can become very expensive. Truck 10 with uplink electronics and large dish 16 can require 6 to 8 men to assemble and operate. In addition, earth station 14 can cost several hundred thousand dollars to own, or tens of thousands of dollars to rent on a per day basis. Therefore, it is important that any portable satellite communications systems be housed in a housing which can withstand significant forces, jolts, etc. This is particularly true when a news team must carry the communications system to remote locations. Similarly, even if the communications system remains in a transport vehicle of some kind, that vehicle must often travel through difficult terrain which can produce large forces which, without a proper housing, could damage or destroy the communications system.

It is further desirable to be able to transport the communications system in adverse weather conditions such as snow, sleet or rain. Therefore, a housing for the communications

system must not only be capable of absorbing significant forces incurred during transport of the communications system, but must also be capable of preventing any moisture from reaching internal components of the communications system.

In addition to the above, excess weight can severely limit the portability of the system and housing. Consequently, the housing above should be relatively light-weight and not add substantial weight to the complete system.

It is also desirable that individual components of the communications system be arranged in such a way as to provide easy access to them for replacement when necessary. The housing should also be compartmentalized in such a way that the communications system with its transmitting and receiving antenna can be quickly and easily set up for transmission and reception. The housing should also be compartmentalized in such a way that components of the system are shielded from microwaves.

The process described with reference to Figure 1A has further drawbacks. For example, in order to operate earth station 14, the news team must obtain a license from the country in which the earth station 14 is located. Since earth station 14 must be shipped to the local country, it also has to pass through that country's local customs office.

Even after all of the above drawbacks are overcome, the news team cannot send the video clip from earth station 14 to television station 28 until several more steps have been performed. First, earth station 14 must contact the appropriate government agency which operates satellite 20 and prebook a specific time period during which the video clip will be transmitted from earth station 14 to television station 28. In addition, earth station 14 and television station 28 both must know and use the protocol required by the particular agency or government which controls satellite 20. Moreover, since the time of transmission via satellite 20 must be prebooked, the uplink will fail if the news team does not have the taped news clip ready. Also, despite its size and complexity, earth station 14

does not typically contain equipment capable of editing the video clip before it is transmitted to television station 28 via satellite 20.

The above scenario can be described as a "best case" scenario since it was assumed that the television station has its own satellite dish 24 and can rent or own an earth station 14. This situation becomes even more complicated and nearly impossible if, for example, television station 28 has to rely on transmitting the video clip out of the country even using that country's government satellite earth station as shown Figure 1B. In particular, Figure 1B shows a government satellite earth station 40 with a large C or Ku dish 44 which uplinks C or Ku microwaves to satellite 20 which in turn downlinks these microwave signals to television station 28.

In this scenario, transmission from earth station 40 must be prebooked with the local government in addition to prebooking a transmission time slot with the government or agency which operates satellite 20. (These two governments are likely not the same.) Moreover, since the local government operates earth station 40, it can censor all such news clips and allow only those news clips or sections of news clips to be transmitted with which the government agrees. Furthermore, many countries will not have such a satellite earth station. Consequently, those television stations which do not have access to earth station 40 or to an earth station similar to earth station 14 in Figure 1A must hand carry or mail the video clip to television station 28 or to another country which does have such an earth station. Hence, by the time the video clip arrives at television station 28, the news it contains is old.

In addition to the above difficulties associated with uplinking a microwave signal to satellite 20, downlinking from satellite 20 to television station 28 may involve one or more hops as shown in Figure 1C. In particular, Figure 1C shows microwave signals uplinked form either earth station 14 or governmental earth station 40 to satellite 20 which in turn must

be downlinked (due to the location of satellite 20) to a first earth station 50 located, for example, in Europe. First earth station 50 must in turn uplink to a second satellite 20' which in turn downlinks to television station 28. During this process, the protocol of each link must be complied with. This creates an even greater burden on the news team.

Teleconferencing technology like news gathering and broadcasting technology involves transmitting video signals from one location to another. However, teleconferencing differs from news gathering in that news gathering typically involves transmitting high quality video images from a first location and receiving that information at a second location, whereas teleconferencing involves both transmitting and receiving video images at each of the first and second locations albeit not necessarily video images of broadcast quality.

Figure 2 shows a first building 200 and a second building 240 interconnected via a high speed digital data network 250 such as (ACUNET) or integrated services digital network (ISDN). These networks are capable of transmitting digital information at rates of 64 kilobits/second (kbps) or in some cases 128 kbps. Network 250 must include a signal routing center 260 (typically owned and operated by a telephone company) and data lines 264 and 268 interconnecting teleconferencing equipment 274 in building 200 to teleconferencing equipment 278 in building 240. Signal routing center 260 can include a variety of satellite, fiber optic and standard hardwired links.

Teleconferencing equipment 274 and 278 must be capable of transmitting and receiving audio/video signals in real time. In order to do this, data lines 264 and 268 must be capable of transmitting more than the standard telephone line audio bandwidth of 9.6 kbps. Consequently, standard telephone lines cannot be used to interconnect teleconferencing equipment 274 to teleconferencing equipment 278.

ACUNET or ISDN interconnection can transmit at high enough bit rates to enable interconnection of teleconferencing

equipment. However, high speed digital (HSD) lines or ISDN lines have been installed in only a few cities throughout the United States and only in the main business districts of those cities. Moreover, only selected buildings within those main business districts have been hard wired with high speed data lines 264 and 268. Also, installation of such high speed data lines is a long and expensive process.

Returning to Figure 1A, the process of sending video clips from a remote location has a variety of additional drawbacks. The news information must be sent from point to point (a serial type of data transfer) rather than from point to multi-point (a parallel type of data transfer). Also, television station 28 can only receive in one direction (the direction in which it is pointed) and can only simultaneously transmit in multiple directions if it has multiple satellite dishes. This process has the further limitation of transmitting and storing video clips in analog form and consequently is not readily compatible with digital land networks such as ACUNET. Also, the current process does not provide on-demand news, but instead news clips must be transmitted on a prearranged basis from satellite earth station 40 to television station 28 and from television station 28 to television station 29.

In addition to the above limitations, the current process does not have a news distribution system which has both digital recording and editing ability. Hence, a television station 29 cannot get its news clips from a hub station and immediately digitally edit those clips. The current process does not provide a digital data base which organizes information so that local television stations can log into a menu which provides a list of particular news clips which are available. The current process does not provide a flexible system which enables a hub station to transmit its video clips at various rates to accommodate various rates of data transfer at various receiving sides. In addition, the process is expensive and local stations cannot selectively choose which news clips they wish to receive.

In addition to the above discussed limitations, vehicle 10 of Figure 1A cannot be uplinked to satellite 20 while vehicle 10 is in motion. Hence, a television news crew cannot pursue a news event which changes its location without undergoing a time consuming process of taking down dish 16, packing up all of their equipment, driving to the new location, setting up all of the equipment in vehicle 10 and satellite dish 16 and obtaining the satellite up and down links as discussed above. Note also that after taking down satellite dish 16, all equipment in vehicle 10 must be secured before that vehicle can be driven to a new location. Otherwise, any rough terrain encountered en route to the next location could result in serious damage to the components in station 14. By the end of such a long process, the news event may have already moved to yet another location. Consequently, station 14 cannot be used to cover outdoor based events of an emergency nature.

In addition to the above, communications sent via dish 16 to satellite 20 can be received by other satellite dishes in the general region of station 14. Hence, communications between station 14 and television station 28 are not secure. Also, stations such as station 14 do not include the capability of editing video information on site before transmitting that information back to television station 28 and do not provide any type of bullet proof shielding.

The above discussed prolonged set up and take down times also severely limit the applicability of system 14 as an emergency medical vehicle. For example, if there is an accident at a remote location, it would be desirable to be able to drive vehicle 10 (loaded with medical diagnostic equipment) to that location in order to provide emergency medical assistance. However, the long set up and take down times effectively eliminate the use of such a vehicle in these circumstances.

In addition to transmitting and receiving audio/video information from a moving vehicle, it is sometimes necessary to provide a means for acquiring audio/video information or other

information from a location remote from the vehicle itself. For example, if there is a newsworthy event which cannot be reached by car or truck, a news crew may have to go to that scene by foot and transmit audio/video information or other information from the remote location to the vehicle itself.

Similarly, in medical situations, accidents often occur in hard-to-reach places such as near cliffs, ski slopes, hiking trails or out at sea, etc. Moreover, patients at the remote locations may often require immediate medical assistance before being transported to the vehicle containing the medical diagnostic equipment. In this case, since the patient is often in hard to reach locations, it is desirable to be able to reach the patient without transporting diagnostic equipment to the patient. Therefore, it is desirable to be able to maintain most diagnostic equipment inside the vehicle itself so that the paramedic need only carry medical sensors leaving the diagnostic equipment on board the vehicle. The paramedic could then use the sensors to transmit all relevant information to the doctor or doctors in the vehicle and follow instructions from them.

Sometimes patients at such remote sites require expertise which is not available even in the vehicle containing the diagnostic equipment. In these cases, it would be desirable to be able to communicate immediately and in real time to a hospital with specialists in the desired fields. Vehicle 10, however, must, as discussed above, be set up and transmission times must be prearranged before communications can be established between vehicle 10 and a hospital with a receiving satellite dish 24 and necessary television equipment. Consequently, station 14 simply cannot provide medical services such as those discussed above.

SUMMARY OF THE INVENTION

An object of the invention therefore is to provide a portable transmission system capable of transmitting information from one location to another.

Another object of the invention is to provide a portable transmission system which can be set up quickly and easily.

Another object of the invention is to provide a portable transmission system capable of receiving audio/video information from a satellite.

Another object of the invention is to provide a teleconferencing station capable of transmitting and receiving audio/video information.

Another object of the invention is to provide a receiving system which is also capable of transmitting audio/video information.

Another object of the invention is to provide a transmission system which can transmit a broadcast quality audio/video signal via microwave signals without using a local earth station.

Another object of the invention is to provide a transmission system which includes editing equipment for editing a video clip before transmission.

Another object of the invention is to be able to transmit audio/video information from a remote area without having to utilize multiple satellites, on an ad hoc, prebooked and prearranged, event-by-event basis.

Another object of the invention is to provide a housing for a communications system which can withstand significant jolts and forces while preventing damage to components in the communications system itself.

Another object of the invention is to provide a housing which can prevent moisture from reaching components of the communications system and protect the communications system from the weather such as rain, sleet or snow.

Another object of the invention is to provide a housing in which components of the communications system can be easily set up for transmission and reception.

Another object of the invention is to provide a housing in which components of the communications system are shielded from microwaves.

Another object of the invention is to provide a global satellite communications vehicle for transmitting and receiving information while in motion or at rest.

Another object of the invention is to provide a vehicle which can operate in a full duplex mode for teleconferencing while in motion or at rest.

Another object of the invention is to provide a communications system which can transmit and receive medical information while in motion or at rest.

Another object of the invention is to provide a system which can link communications between a paramedic in a remote location and a specialist anywhere in the world.

Another object of the invention is to provide a system which can transmit diagnostic information from the vehicle to a hospital while en route to that hospital.

Another object of the invention is to provide a communications system which can be set up quickly and easily.

Another object of the invention is to provide a system which includes equipment for editing video clips.

It is also an object of the invention to provide an information distribution system which can disseminate information from one point to a plurality of receivers in a parallel fashion.

Another object of the invention is to provide a method and apparatus which can simultaneously transmit audio/video information in diametrically opposite directions.

Another object of the invention is to provide a method and apparatus which is readily compatible with digital networks such as ACUNET.

Another object of the invention is to provide on-demand access to audio/video news clips.

One advantage of this system is that information can be transferred independent of a local government's communications protocol and in multi-satellite configurations, information is transmitted transparently and automatically.

Another advantage of the invention is that it utilizes over 95% of the bandwidth available in a satellite link for audio/video information and 5% for overhead information as opposed to the current practice of 60% of the bandwidth for audio/video information and 40% of the bandwidth for overhead.

Another advantage of the invention is that it is point-of-origin independent.

Another advantage of the invention is that it makes it possible to transmit and receive audio/video information from any place in the world to any place in the world except possibly at the extreme polar caps.

Another advantage of the invention is that it provides transmission of audio/video information on an on-demand, dial-up basis.

Another advantage of the invention is that it is portable in the sense that it can be hand carried by one person in a suitcase.

Another advantage of the invention is that it transmits high quality television pictures even with the presence of small to medium motion in the pictures.

Another advantage of the invention is that it can multiply line rates and feed multi-scan monitors and screens thereby dramatically improving picture resolution.

Another advantage of the invention is that it is compatible with high definition (HD) television.

Another advantage of the invention is that it can be set up and made ready to transmit within a few minutes.

Another advantage of the invention is that it can receive data from an HDS line or an ISDN line.

Another advantage of the invention is that it can operate using the power from a single car battery to power the transmission or receiving system.

Another advantage of the invention is that it automatically compensates for color standards differences when transmitting,

e.g., from PAL (the European standard) to NTSC (the U.S. standard) and vice versa.

Another advantage of the invention is that the housing can protect the communications system from external jolts and damaging forces.

Another advantage of the invention is that the housing prevents moisture from reaching components of the communications system.

Another advantage of the invention is that the housing allows individual components of the communications system to be arranged in such a way that they can be easily replaced.

Yet another advantage of the invention is that the housing makes it easy for a user to set up and take down the communications system.

Another advantage of the invention is that it makes it possible to transmit and receive audio/video information from any place in the world to any place in the world except possibly at the extreme polar caps, despite having to endure jolts and shocks from rough terrain in order to reach remote locations.

Another advantage of the invention is that it eliminates the need to prearrange times to transmit from one satellite earth station to a television station or from one television station to another television station.

Another advantage of the invention is that it provides a news distribution system which has both digital recording and scan conversion capabilities so that a local television station can get its news clips from a hub station and selectively edit those clips.

Another advantage of the invention is that it transmits news clips inexpensively.

Another advantage of the invention is that it provides news information organized so that local television stations can log into a menu which provides a list of available news clips and how to acquire those clips.

Another advantage of the system is that it can transmit audio/video information while in motion.

Another advantage of the system is that it can transmit and receive high quality audio/video information in real time.

Another advantage of the system is that it can be used to cover outdoor events in emergency situations.

Another advantage of the system is that it has one or more microwave communication links which provide communications between the vehicle and an individual at a remote location.

Another advantage of the invention is that it provides secure communications.

Another advantage of the system is that it provides position, speed and altitude of the vehicle.

Another advantage of the invention is that it provides transmission and reception of audio/video information on a dial-up basis.

Another advantage of the system is that it is capable of withstanding several G's of shock while moving and still operate properly.

Another advantage of the invention is that it accepts scrambling devices.

Another advantage of the invention is that it does not require the use of a satellite dish or "dome" visible on the rooftop of the vehicle, but instead, the vehicle appears like an ordinary recreational vehicle from the outside.

A feature of the invention is that it utilizes a light-weight, durable suitcase capable of withstanding large external forces.

Another feature of the invention is that the suitcase can absorb shocks and jolts.

Another feature of the invention is that all of the equipment used for the communications system are secured to a plate which rests on a ridge of the suitcase.

Another feature of the invention is that the plate is flexible.

Another feature of the invention is that components of the communications system are attached to panels which can be easily inserted and removed from the suitcase.

Another feature of the invention is that these panels are perforated, thereby acting as microwave shields.

Another feature of the invention is that the panels are attached to the flexible plate using a screw with a rubber stopper which additionally absorbs forces between the panel and the flexible plate.

Another feature of the invention is that it utilizes an O-ring along the edges of the suitcase in order to insure that moisture cannot reach individual components of the communications system while the housing is closed.

Another feature of the invention is that the flexible plate rests on the holding ledge within the suitcase and there is a spacing between the edges of the flexible plate and the sides of the suitcase.

Another feature of the invention is that a strip of shock absorbing material is sandwiched between the flexible plate and the holding ledge.

Another feature of the invention is that the panels are arranged in a frame which itself is attached to the plate yet cushioned therefrom with rubber cylinders to provide even more isolation.

Another feature of the invention is that certain highly shock sensitive components such as hard disk drives can be attached to a bottom panel of the frame but cushioned therefrom with further rubber cylinders to provide even more isolation.

Yet another feature of the invention is that it uses a small, fabric, microwave umbrella dish which transmits the microwave signal on the L-band (1.5 Ghz).

Another feature of the invention is that it has a built-in forward error correction modem which compensates for heavy snow or rainfall blockage during transmission.

Another feature of the invention is that it uses coding and decoding (CODEC) technology which has a very high degree of motion adaptivity and motion compensation, thereby providing a smooth, high quality picture.

Another feature of the invention is that an analog audio/video signal is digitized and compressed before being transmitted.

Another feature of the invention is that it uses field time visually lossless digital data compression of an audio/video signal.

Another feature of the invention is that it includes video editing equipment for editing the audio/video signal before transmission.

Another advantage of the invention is that the transmission system can easily be converted to a receiving system and vice versa.

Another feature of the invention is that it compresses digital video information when operating as a transmission system and decompresses digital video information when operating as a receiving system.

Another feature of the invention is that it provides a hub station which can transmit its video clips at various rates to accommodate various rates of data transfer at various receiving locations.

Another feature of the invention is that local stations can selectively choose which news clips they wish to receive.

Another feature of the invention is that it makes it possible to selectively edit news clips at the local station, if desired.

Another feature of the invention is that it utilizes a receive signal processor.

Another feature of the invention is that it utilizes a vehicle with physical storage capacity such as a truck or a van.

Another feature of the invention is that it utilizes relatively small antennas.

Another feature of the invention is that it utilizes remote extension packs capable of transmitting and receiving video and sound via one or more microwave links.

Another feature of the invention is that it utilizes digital communications and hence the communications are difficult to intercept.

Another feature of the invention is that it can use any type of communication link between the system and a remote location, such as an infrared or optical link.

Another feature of the invention is that it utilizes a standard A antenna terminal and antenna.

Another feature of the invention is that it utilizes a standard M terminal and antenna array.

Another feature of the invention is that it can utilize a standard B-type terminal and antenna.

Another feature of the invention is that it utilizes a global positioning system (GPS) receiver and antenna.

Another feature of the invention is that it is powered by a power generator which is mounted in the vehicle.

Another feature of the invention is that it utilizes a standard C system to transmit GPS derived information to any Inmarsat C equipped transmitter/receiver in the world.

Another feature of the invention is that it can be housed in a vehicle with bullet proof panels.

The above and other objects, advantages and features are accomplished in accordance with the invention by the provision of a portable integrated transmission system, including: a transmit interface unit for transforming an analog signal into a digital signal; a transmit signal processing unit for compressing the digital signal into a compressed asynchronous signal; a transmit signal converting unit for converting the compressed asynchronous signal into a compressed synchronous signal; and a microwave transmitting unit for generating a microwave signal and modulating the microwave signal with the

compressed synchronous signal to provide a modulated microwave signal and for transmitting the modulated microwave signal.

The above and other objects, advantages and features are further accomplished in accordance with the invention by the provision of a portable integrated receiving system, including: a microwave receiving unit for receiving a modulated microwave signal which has been modulated with a compressed synchronous signal and for demodulating the modulated microwave signal into the compressed synchronous signal; a receive signal converting unit for converting the compressed synchronous signal into a compressed asynchronous signal; and a receive signal processing unit for decompressing the compressed asynchronous signal into a digital signal and outputting the digital signal.

The above and other objects, advantages and features are also accomplished in accordance with the invention by the provision of a transmission and receiving system, which includes: a transmit interface unit for transforming an analog signal into a digital signal; a transmit signal processing unit coupled to the transmit interface unit for compressing the digital signal into a compressed asynchronous signal; a transmit signal converting unit coupled to the transmit signal processing unit for converting the compressed asynchronous signal into a compressed synchronous signal; a microwave transmitting unit coupled to the transmit signal converting unit for generating a microwave signal and modulating the microwave signal with the compressed synchronous signal to provide a first modulated microwave signal and for transmitting the first modulated microwave signal; a microwave receiving unit for receiving a second modulated microwave signal which has been modulated with the compressed synchronous and for demodulating the second modulated microwave signal yielding the compressed synchronous signal; a receive signal converting unit coupled to the microwave receiving unit for converting the compressed synchronous signal into the compressed asynchronous signal; and a second signal processing unit coupled to the receive signal converting unit for

decompressing the compressed asynchronous signal into the digital signal and outputting the digital signal.

The above and other objects, advantages and features are alternatively accomplished in accordance with the invention by the provision of a portable digital high speed data line receiving system, including: a receive signal converting unit for receiving a compressed synchronous signal from a high speed data line, translating voltage levels of the compressed synchronous signal and converting the compressed synchronous signal into a compressed asynchronous signal; and a receive signal processing unit coupled to the receive signal converting unit for decompressing the compressed asynchronous signal into a digital signal and outputting the digital signal.

The above and other objects, advantages and features are accomplished in accordance with the invention by the provisions of a portable integrated teleconference station, including: a demodulating unit for receiving and demodulating an analog signal and outputting a first digital signal; an encoding and compressing unit coupled to the demodulating unit for receiving the first digital signal and for encoding and compressing the first digital signal to yield a first compressed encoded signal; a microwave transmitting and receiving unit coupled to the encoding and compressing unit for receiving the first compressed encoded signal, for generating a first microwave signal, for modulating the first microwave signal according to the first compressed encoded signal to provide a first modulated microwave signal and for outputting the first modulated microwave signal, as well as for receiving a second modulated microwave signal which has been modulated with a second compressed encoded signal; a satellite modem demodulating unit coupled to the microwave transmitting and receiving unit for receiving and demodulating the second modulated microwave signal to yield the second compressed encoded signal; and a decoding and decompressing unit coupled to the satellite modem demodulating unit for decoding and

decompressing the second compressed encoded signal into a second digital signal and for outputting the second digital signal.

The above and other objects, advantages and features are alternatively accomplished in accordance with the invention by the provision of a high speed digital teleconference station, including: a demodulating unit for receiving a first analog signal and outputting a first digital signal; an encoding/compression unit coupled to the demodulating unit for receiving, compressing and encoding the first digital signal into a first compressed encoded signal and outputting the first compressed encoded signal to a high speed data line; and a decoding/decompression unit for receiving a second compressed encoded signal from the high speed data line and for decoding and decompressing the second compressed encoded signal into a second digital signal and outputting the second digital signal.

The above and other objects, advantages and features are further accomplished in accordance with the invention by the provision of a high speed teleconference station including: an interface unit for receiving a first analog signal and outputting a first digital signal; and encoding/compressing unit for encoding and compressing the first digital signal to yield a first compressed encoded signal; a multiplexing and demultiplexing unit for receiving and splitting the first compressed encoded signal into two first compressed encoded signals and for receiving two second encoded compressed signals and outputting a combined second encoded compressed signal; dual converting unit coupled to the multiplexing and demultiplexing unit for receiving the two first compressed encoded signals and outputting two first synchronous signals and for receiving two second synchronous signals and outputting the two second encoded compressed signals; two microwave transmitter/receiver units for receiving the two first synchronous signals, for generating two first microwave signals, for modulating the two first microwave signals according to the two first synchronous signals to provide two first modulated microwave signals and for outputting the two

first modulated microwave signals, as well as for receiving two second modulated microwave signals which have been modulated with the two second synchronous signals and for outputting the two second synchronous signals; combining/splitting unit for combining the two first modulated microwave signals into a combined first modulated microwave signal and for splitting a combined second modulated microwave signal into the two second modulated microwave signals; and decoding/decompressing unit coupled to the multiplexing and demultiplexing unit for decoding and decompressing the combined second encoded compressed signal and outputting a second digital signal.

The above and other objects, advantages and features are further accomplished in accordance with the invention by the provision of a method of transmitting and receiving information, including the steps of: compressing a digital signal containing the information into a compressed asynchronous signal using a first processor; converting the compressed asynchronous signal into a compressed synchronous signal; generating a microwave signal and modulating the microwave signal with the compressed synchronous signal to provide a first modulated microwave signal using a microwave transmitter; transmitting the first modulated microwave signal with the microwave transmitter; receiving a second modulated microwave signal which has been modulated with the compressed synchronous signal at a microwave receiver; demodulating the second modulated microwave signal yielding the compressed synchronous signal; converting the compressed synchronous signal into the compressed asynchronous signal; and decompressing the compressed asynchronous signal into the digital signal using a second processor; and outputting the digital signal containing the information.

These and other objects, advantages and features are accomplished according to the invention by the provision of an information distribution system for a digital network, which includes: a master communications unit coupled to the digital network for establishing communications with the network in order

to receive a synchronous digital signal from the network. The system also provides for a plurality of communications units coupled to the distribution amplifier unit for establishing communications with a plurality of receiving stations and for receiving and outputting a respective one of the plurality of synchronous signals to the plurality of receiving stations. The system further includes a master controller unit coupled to the plurality of communications units for controlling the plurality of communications units from a central location.

The above objects, advantages and features are even further accomplished by the provision of an input unit in the master controller unit for inputting instructions to control the plurality of communications units.

The above and other objects, advantages and features are further accomplished by the provision of a first back-up memory for receiving and storing at least one asynchronous signal.

The above and other objects, advantages and features are further accomplished by the provision of an equalizing unit for equalizing respective amplitudes of the plurality of synchronous signals.

These and other objects, advantages and features are accomplished by the provision of an information disseminating system for a digital network, including: a plurality of video clip storing units for storing data, each of the plurality of video clip storing units storing data related to a particular subject matter; a plurality of distribution amplifier units each having an input for receiving data from a respective one of the plurality of video clip storing units and each having at least one output, for dividing the data stored in each of the plurality of video clip storing units. The system further includes a plurality of communications units at least one of which is coupled to a respective one of the plurality of distribution amplifiers, wherein the plurality of communications units establish communications between the plurality of distribution amplifier units and the digital network. The system further

includes a menu storing unit accessible from the digital network, for storing information indicating the subject matter associated with each of the plurality of video clip storing units as well as information as to how to access each of the video clip storing units.

These and other objects, advantages and features are further accomplished by the provision of a method for distributing information to various locations in a digital network, including the steps of: establishing communications with the network in order to receive a synchronous digital signal from the network; receiving and dividing the synchronous digital signal into a plurality of synchronous signals; establishing communications with a plurality of receiving stations; receiving and outputting a respective one of the plurality of synchronous signals to a respective receiving station; and controlling the receiving and outputting step with a controller unit at a central location.

These and other objects, advantages and features accomplished by the provision of a mobile microwave system, including: a power generator; a microwave subsystem coupled to the power generator for transmitting first local microwave signals modulated with first local digital data while in motion with respect to earth and for receiving first remote microwave signals modulated with first remote digital data while in motion with respect to earth; a high speed digital station coupled to the power generator and the microwave subsystem, for receiving a video signal and for transforming and compressing the video signal into the first local digital data and for transforming and decompressing the first remote digital data into a first decompressed remote digital data; and a vehicle for housing the power generator, the microwave subsystem and the high speed digital station, the vehicle having a lower portion and an upper portion, wherein the first local microwave signals can pass through the upper portion.

The above and other objects, advantages and features are accomplished by the further provision of: GPS antenna; and GPS

receiver coupled to the gps antenna and the high speed digital station, for determining location information of the vehicle and outputting the location information to the high speed digital station, as GPS data, as well as the further provision of a standard C antenna; a standard C transmitter and receiver, coupled to at least one of the GPS receiver and the high speed digital station for receiving the location information and transmitting the location information to a satellite.

The above objects, advantages and features are also accomplished by the provision of an L band microwave system, comprising: an L band microwave subsystem for transmitting first local microwave signals modulated with first local digital data and for receiving first remote microwave signals modulated with first remote digital data; and a high speed digital station coupled to the L band microwave subsystem, for receiving a video signal and for transforming, editing and compressing the video signal into the first local digital data and for decompressing, editing and transforming the first remote digital data into first decompressed remote digital data.

The above and other objects, advantages and features are accomplished by the further provision of: a GPS antenna; and GPS receiver coupled to the GPS antenna and the high speed digital station, for determining location information of the vehicle and outputting the location information to the high speed digital station, as GPS data as well as a standard C antenna; a standard C transmitter and receiver, coupled to at least one of the GPS receiver and the high speed digital station for receiving the location information and transmitting the location information to a satellite.

The above and other objects, advantages and features are alternatively accomplished by the provision of an L band microwave system, comprising: a power generator; a standard A subsystem coupled to the power generator, including: an antenna assembly for transmitting A band local microwave signals and for receiving A band remote microwave signals; and a standard A

antenna terminal coupled to the standard A antenna assembly for receiving, demodulating and processing the A band remote microwave signals to yield first remote digital signals, and for processing first local digital signals to generate the A band local microwave signals and for controlling the antenna assembly in accordance with GPS data; a standard M subsystem coupled to the power generator, including: an array antenna for transmitting M band local microwave signals and for receiving M band remote microwave signals; and a standard M array antenna terminal coupled to the array antenna for receiving, demodulating and processing the M band remote microwave signals to yield second remote digital signals, for processing second local digital signals to generate the M band local microwave signals and for controlling the array antenna in accordance with the GPS data; a high speed digital station coupled to the A band subsystem, the standard M subsystem and the power generator, including: a signal converter for receiving and converting the first and second remote digital data and outputting first and second asynchronous compressed remote digital data, respectively, and for receiving and converting first and second asynchronous compressed local digital data to yield the first and second local digital data, respectively; a receive signal processor for receiving, editing and decompressing the first and second asynchronous compressed remote digital data to yield first and second decompressed remote digital data and for compressing and editing first and second decompressed local digital data to yield the first and second asynchronous compressed local digital data; and video signal receiver and display coupled to the receive signal processor for receiving and displaying at least one of the first and second decompressed remote digital data, and for receiving a video signal and transforming the video signal into the first and second decompressed local digital data and for displaying the video signal; a microwave suitcase subsystem, including: microwave transmitter for receiving an external video signal and transmitting a microwave signal modulated with the external video

signal; and microwave receiver for receiving and demodulating the microwave signal to yield the video signal; a GPS subsystem coupled to the power generator, comprising: GPS antenna; and a GPS receiver coupled to the GPS antenna and the high speed digital station, for determining location information of the vehicle and outputting the location information to the high speed digital station, as the GPS data; a vehicle for housing the power generator, the standard A subsystem, the standard M subsystem, the high speed digital station and the microwave receiver, the vehicle including a lower portion and an upper portion, wherein the upper portion passes L band microwaves; and video camera coupled to the video camera signal receiver via the microwave suitcase subsystem, for outputting the external video signal.

The above and other objects, advantages and features of the present invention will become more apparent from the following description of embodiments thereof taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1A and 1B show a truck with a satellite dish which together serve as a point-of-origin independent work station and a government satellite earth station, respectively, and Figure 1C shows microwave signals uplinked from either the earth station of Figure 1A or the governmental earth station of Figure 1B.

Figure 2 shows a first building and a second building connected via a high speed digital data network such as ACUNET or ISDN.

Figures 3A and 3B show a transmission and receiving system according to one embodiment of the invention.

Figures 4A and 4B show a transmission and digital receiving system according to another embodiment of the invention.

Figures 5A and 5B show an alternative transmission system and receiving system which communicate with each other via a patch unit.

Figures 6A and 6B show a teleconference system according to another embodiment of the invention.

Figures 7A and 7B show a teleconference system according to yet another embodiment of the invention.

Figure 8 shows a high speed (128 kbps) teleconference system.

Figure 9 shows a high speed teleconference system with a first high speed teleconference station as shown in Figure 8 but with a second high speed teleconference station according to another embodiment of the invention.

Figure 10A shows a suitcase for housing any one of the embodiments described above and Figure 10B shows the suitcase in Figure 10A with an opened fabric microwave umbrella dish.

Figure 11A shows a digital information distribution system according to one embodiment of the invention; Figure 11B shows a transmission system which can be used to transmit video clips from remote locations; and Figure 11C shows backup units which include a signal converter and a receive signal processor.

Figure 12 shows the digital information distribution system in more detail.

Figures 13A and 13B show a rear and a front view, respectively, of a distribution amplifier/equalizer in the digital information distribution system.

Figure 14 shows a master controller connected to a plurality of CSU/DSUs in the distribution system.

Figure 15 shows an on-demand video news distribution system according to another embodiment of the invention.

Figure 16A shows a vehicle with a communications system which includes a signal processor, Figure 16B shows the global satellite communications vehicle together with remote digital suitcase systems according to one embodiment of the invention and Figure 16C shows remote digital suitcase system with an open microwave umbrella dish.

Figure 17 shows a somewhat more detailed diagram of the global satellite communication vehicle.

Figure 18 shows various equipment and how they are interconnected in the communications vehicle shown in Figure 17.

Figure 19 shows a more detailed block diagram of the processing equipment in the global satellite communications vehicle.

Figure 20 shows an alternate approach to coupling sensors to the global satellite communications vehicle via L1.

Figure 21A shows the housing with a lid and a bottom portion according to one embodiment of the invention and Figure 21B shows the housing with the lid removed.

Figure 22A shows a plate and Figure 22B shows the bottom portion as viewed from above with the plate resting on a ledge.

Figure 23 shows a view along axis A of Figure 22B with portable integrated communications equipment attached thereto.

Figure 24 shows a close-up view of the ledge together with the bottom portion of the housing.

Figure 25 shows a close-up view of how the lid rests on the bottom portion of the housing.

Figure 26A shows a basket frame which is attached to the underside of the plate and Figure 26B shows the frame as viewed from the side without side panels.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figures 3A and 3B show a transmission and receiving system 400 according to one embodiment of the invention. In particular, Figure 3A shows a transmission system 410 at a first location which communicates with a receiving system 420 at a second location via satellite 20. Throughout this discussion, embodiments of the invention will be described with respect to transmitting audio/video information, it being understood that the invention will transmit any type of analog or digital information such as digital data files, sensor signals (analog or digital), etc.

Transmission system 410 includes an interface unit 430 which receives an analog audio signal and an analog video signal which

will be referred to here as an analog audio/video signal and transforms the video portion of the analog audio/video signal into a digital red, green, blue (RGB) signal. The audio/video signal can come from a camera or a video tape recorder (VTR) neither of which is shown in the figure. Interface unit 430 demodulates the audio/video signal which is either NTSC, PAL, or SECAM signal and outputs the digital RGB signal. The digital RGB signal output from interface unit 430 is then received by a transmit signal processor 440 which compresses the digital RGB signal into an asynchronous compressed signal and stores that asynchronous compressed signal on a hard disk 440A. Transmit signal processor 440 can then output the asynchronous compressed signal at high speeds using a high speed modem (not shown). The asynchronous compressed signal is in turn received by a signal converter 450T which includes a protocol converter 454T and a level translation unit 458T. Protocol converter 454T receives the asynchronous compressed signal and converts that signal to a synchronous compressed signal. The synchronous compressed signal is then input to level translation unit 458T which swaps wires and translates the synchronous compressed signal voltage levels into a level translated synchronous compressed signal which is received by a microwave transmitter 460T. Microwave transmitter 460T includes a modulator which modulates the synchronous compressed signal onto a modulated L-band microwave signal. Microwave transmitter 460T then transmits the modulated L-band microwave signal to satellite 20 (which can include one or more earth stations) which receives the L-band microwave signal and transmits that signal to receiving system 420. In particular, microwave transmitter 460T includes an L-band microwave generator 460A, a satellite dish 460B and a microwave modulator 460C. Satellite modem 459 monitors the transmission of the modulated microwave signal from microwave transmitter 460T to receiving system 420. In particular, satellite modem 459 performs handshaking with receiving system 420 at the beginning of transmission and continues to monitor the transmission to

determine whether receiving system 420 is being sent the correct signal.

Receiving system 420 includes a microwave receiver 470 which receives the modulated microwave signal and demodulates that signal. Satellite modem 472 performs handshaking with transmission system 410 in a manner similar to satellite modem 459. Microwave receiver 470 includes a microwave demodulator 470C and a microwave dish 470B. A receive signal converter 450R which includes a level translation unit 458R and a protocol converter 454R is similar to signal converter 450T with corresponding level translation unit 458T and protocol converter 454T, respectively. Signal converter 450R operates like signal converter 450T used in the reverse direction. Namely, level translation unit 458R receives a level translated demodulated signal and translates the level of that signal back down to asynchronous (RS-232) signal which can be received by protocol converter 454R and converted to an asynchronous compressed signal. This asynchronous compressed signal is then received by receive signal processor 460 which decompresses it and stores it on a hard disk 460A'. If the decompression of the asynchronous compressed signal received by receive signal processor 460 is the inverse of the compression which the digital RGB signal underwent in transmit signal processor 440, receive signal processor 460 outputs that same digital RGB signal. Consequently, the digital signal at the first location is available at the second location. A scan converter 464 can receive this digital signal and drive a studio monitor 472 via bus 468.

Figures 4A and 4B show a transmission system and digital receiving system 500 according to another embodiment of the invention. Those elements in system 500 which are also used in transmission and receiving system 400 will be given the same reference numerals. Transmission system 410 is identical to system 410 in system 400 of Figure 3A. However, instead of receiving microwave signals from satellite 20 via microwave receiver 470 as in Figure 3A, a digital receiving system 510

receives digital data from a digital high speed data (DHSD) link 514 available from a phone company. Receiving system 510 includes a signal converter 550R followed by receive signal processor 460. Signal converter 550R includes level translation unit 558R followed by protocol converter 454R.

The microwave signal modulated with compressed digital data is received by a satellite dish (here considered to be part of DHSD link 514) and in turn demodulated to yield a demodulated high speed digital (HSD) signal on DHSD line 516. DHSD link 514 includes satellite, fiber optic and hard wire links. Signal converter 550R receives the digital signal at level translation unit 558R which translates its voltage level for transmission on serial line 456R as a synchronous compressed signal. Protocol converter 454R receives and transforms the synchronous compressed signal into an asynchronous, compressed signal for transmission on bus 446. Receive signal processor 460 in turn receives and decompresses the asynchronous, compressed signal into a digital RGB signal ready to be received and converted by scan converter 464 via line 462 for display via bus 468 on monitor (or VTR) 472.

Figure 5A shows an alternative way in which transmission system 410 and receiving system 420 can communicate with each other by using a patch unit 580. Figure 5B shows a more detailed view of patch unit 580. Referring to Figure 5A, transmission system 410 outputs a microwave signal with a digitized and compressed video clip modulated onto the microwave signal. Satellite 20 receives the microwave signal from transmission system 410 and downlinks the microwave signal to a transmitting DHSD link 514T identical to DHSD link 514 of Figure 4A. Transmitting DHSD link 514T receives the microwave signal via a satellite (not shown), transforms that signal into an HSD signal and transmits that HSD signal to patch unit 580 via line 586T. Patch unit 580 then routes that signal to a receiving line 586R. Receiving DHSD link 514R receives the HSD signal, transforms that signal into a microwave signal and transmits that microwave signal back to satellite 20. Satellite 20 receives that

microwave signal and transmits it to receiving system 420 which receives it and eventually outputs a digital RGB signal.

Figure 5B shows a more detailed view of patch unit 580. Patch unit 580 includes a DCU/DTE conversion unit 510T connected to a null modem 512 followed by a DCU/DTE conversion unit 510R. Line 586T transmits the HSD signal output from DHSD transmission link to DCU/DTE converter 510T and outputs a digital signal on a V.35 pin bus 521T to null modem 512. Null modem 512 is wired so that both DCU/DTE converters 510T and 510R operate as if they are connected to a regular DCU modem. Null modem 512 outputs the digital signal on V.35 pin bus 521R to DCU/DTE converter 510R which receives it and outputs the digital signal via 586R to DHSD link 514R for eventual transmission to satellite 20.

Figures 6A and 6B show a teleconference system 600 according to another embodiment of the invention. In particular, teleconference system 600 includes a first teleconference station 610F at a first location and an identical second teleconference station 610S at a second location. First and second teleconference stations 610F and 610S have first and second demodulation/converting units 630F and 630S, first and second signal processing units 640F and 640S, first and second satellite modems 650F and 650S and microwave transmitter/receivers 660F and 660S, respectively. First and second microwave transmitter/receivers 660F and 660S include L-band microwave generators 660FA and 660SA, satellite dishes 660FB and 660SB and microwave modulator 660FC and 660SC, respectively. First and second demodulation/converting units 630F and 630S include first and second video demodulation units 631F and 631S, first and second encoding units 633F and 633S and first and second scan down converters 635F and 635S, respectively. Also, first and second signal processing units 640F and 640S include first and second encoding/compression units 641F and 641S, as well as first and second decoding/decompression units 643F and 643S, respectively. First demodulation/converting unit 630F together with first signal processing unit 640F make up a first two-way

digital video processor 645F. Similarly, second demodulation/converting unit 630S together with second signal processing unit 640S make up a second two-way digital video processor 645S.

The teleconference system operates to send a first audio/video signal from a first camera (not shown) to be displayed by second monitor 670S at second teleconference station 610S while simultaneously sending a second audio/video signal from a second camera (not shown) at second teleconference station 610S to be displayed by first monitor 670F at first teleconference station 610F. Each of these processes is described below.

A first analog audio/video signal is sent from first teleconference station 610F to second teleconference station 610S as follows. The first analog audio/video signal output from a first camera (not shown) at the first location is input to first video demodulation unit 631F. First video demodulation unit 631F then demodulates and digitizes the first analog audio/video signal and outputs a resulting first digital signal. The first digital signal is then input to first encoding/compression unit 641F which can compensate for a high degree of motion, thereby providing smoother, sharper, "non-pixelized" or jittering pictures. First encoding/compression unit 641F in turn encodes and compresses the first digital signal and outputs a first compressed, encoded signal. The first compressed, encoded signal is then received by first microwave transmitter/receiver 660F, which in turn modulates a first microwave signal with the first compressed, encoded signal and transmits a resulting first modulated microwave signal to satellite 20.

Satellite 20 receives the first modulated microwave signal and outputs a downlinking modulated microwave signal having the first compressed, encoded signal modulated thereon. Second microwave transmitter/receiver 660S in second teleconference station 610S receives and demodulates this downlinking modulated signal into the first compressed, encoded signal. Second

satellite modem 650S monitors second transmitter/receiver 660S to insure that the signal output from second microwave transmitter/receiver 660S is the same as the first compressed, encoded signal which was earlier output from first signal processing unit 640F. Second transmitter/receiver 660S outputs the first compressed, encoded signal to second decoding/decompression unit 643S in second signal processing unit 640S. Second decoding/decompression unit 643S demodulates and decompresses the first encoded, compressed signal into the first digital signal which is the same as the first digital signal output from first demodulation/converting unit 630F in first teleconference station 610F. This first digital signal is then received by second encoding unit 633S of second demodulation/converting unit 630S to be encoded into NTSC or PAL protocol for viewing on a television set (not shown). Alternatively, the first digital signal is received by second scan down converter 635S of second demodulation/converting unit 630S which outputs a display signal to be viewed on second studio monitor 670S.

A second analog audio/video signal is sent from second teleconference station 610S to first teleconference station 610F as follows. The second analog audio/video signal is output from a second camera (not shown) at the second location and input to second video demodulation unit 631S. Second video demodulation unit 631S then demodulates and digitizes the second analog audio/video signal and outputs a resulting second digital signal. The second digital signal is then input to second encoding/compression unit 641S of second signal processing unit 640S. Second encoding/compression unit 641S in turn encodes and compresses the second digital signal and outputs a second compressed, encoded signal. The second compressed, encoded signal is then received by second microwave transmitter/receiver 660S, which in turn modulates a second microwave signal with the second compressed, encoded signal and transmits a resulting second modulated microwave signal to satellite 20.

Satellite 20 receives the second modulated microwave signal and outputs a downlinking modulated microwave signal having the second compressed, encoded signal modulated thereon. First microwave transmitter/receiver 660F in first teleconference station 610F receives and demodulates this downlinking modulated signal into the second compressed, encoded signal. First satellite modem 650F monitors first transmitter/receiver 660F to insure that the signal output from first microwave transmitter/receiver 660F is the same as the second compressed, encoded signal which was earlier output from second signal processing unit 640S. First transmitter/receiver 660F outputs the second compressed, encoded signal to first decoding/decompression unit 643F in first signal processing unit 640F. First decoding/decompression unit 643F demodulates and decompresses the second encoded, compressed signal into the second digital signal which is the same as the second digital signal output from second demodulation/converting unit 630S in second teleconference station 610S. This second digital signal is then received by first encoding unit 633F of first demodulation/converting unit 630F to be encoded into NTSC or PAL protocol for viewing on a television set (not shown). Alternatively, the second digital signal is received by first scan down converter 635F of first demodulation/converting unit 630F which outputs a display signal to be viewed on first studio monitor 670F.

Figure 7A and 7B show a teleconference system 700 according to another embodiment of the invention. Teleconference system 700 includes teleconference station 710 at a first location and an HSD teleconference station 720 at a second location. Teleconference station 710 is identical to first or second teleconference station 610F or 610S of teleconference system 600 in Figure 6A. In particular, teleconference station 710 has a first two-way digital video processor 745F together with first satellite modem 750F and first microwave transmitter/receiver 760F which are identical to first two-way digital video processor

645F, first satellite modem 650F and first microwave transmitter/receiver 660F of Figure 6A, respectively. Also, first two-way digital video processor 745F includes a first demodulation/converting unit 730F and a first signal processing unit 740F identical to first demodulation/converting unit 630F and first signal processing unit 640F of Figure 6A, respectively. Similarly, first demodulation/converting unit 730F includes a first video demodulation unit 731F, first encoding unit 733F and first scan down converter 735F which are identical to first video demodulation unit 631F, first encoding unit 633F and first scan down converter 635F, respectively of Figure 6A. Finally, first signal processing unit 740F includes first encoding/compression unit 741F, as well as first decoding decompression unit 743F which are identical to first encoding/compression unit 641F, as well as first decoding/decompression unit 643F, respectively of Figure 6A.

HSD teleconference station 720 is connected to a digital high speed data (DHSD) link 714 via two HSD lines 716A and 716B. HSD teleconference station 720 includes a second demodulation/converting unit 730S and a second signal processing unit 740S. Second demodulation/converting unit 730S includes a second video demodulation unit 731S, second encoding unit 733S and second scan down converter 735S. Second signal processing unit 740S includes second encoding/compression unit 741S and second decoding/decompression unit 743S.

Teleconference system 700 operates as follows. Teleconference station 710 is the same as first teleconference station 610F described above. Namely, a first audio/video signal is received, processed and transmitted from teleconference station 710 to satellite 20 the same way that the first audio/video signal was received, processed and transmitted from first teleconference station 610F. Also, a downlinked microwave signal is received, processed and output by teleconference station 710 to monitor 770F (or a television or VTR) the same way

that the downlinked microwave signal was received, processed and output by first teleconference station 610F to monitor 670F.

At HSD teleconference station 720, a second analog audio/video signal from a second camera (not shown) is input to second video demodulation unit 731S. Second video demodulation unit 731S then demodulates and digitizes the second analog audio/video signal and outputs a resulting second digital signal. The second digital signal is then input to second encoding/compression unit 741S of second signal processing unit 740S. Second encoding/compression unit 741S in turn compresses and encodes the second digital signal and outputs a second compressed, encoded signal which is sent via HSD line 716A to DHSD link 714 (which is the same as DHSD link 514 discussed with reference to Figure 4A) to be transmitted to satellite 20 and downlinked to teleconference station 710 as described above.

Satellite 20 downlinks a downlink microwave signal with the first encoded compressed signal modulated thereon to DHSD link 714 which receives and demodulates it and outputs the first compressed, encoded signal as a first demodulated high speed digital (HSD) signal on DHSD line 716B. HSD teleconference station 720 then receives the first HSD signal and eventually outputs an analog RGB signal to second studio monitor 770S or outputs an audio/video signal to a television (not shown) in a manner identical to second two-way digital video processor 645S.

Figure 8 shows a high speed (128 kbps) teleconference system 800 which includes a first high speed teleconference station 810F and a second high speed teleconference station 810S. First high speed teleconference station 810F has a first interface unit 830F, a first decoding/decompression unit 841F, a first encoding/compressing unit 843F, a first multiplexer 851F, two first protocol converters 855FA and 855FB, two first satellite modem (demodulators) 850FA and 850FB, two first microwave transmitter/receivers 860FA and 860FB, a first microwave combiner/splitter 863F and a first microwave dish 870F.

Second high speed teleconference station 810S has a second interface unit 830S, a second decoding/decompressing unit 841S, a second encoding/compressing unit 843S, a second multiplexer 851S, two second protocol converters 855SA and 855SB, two second satellite modem demodulators 850SA and 850SB, two second microwave transmitter/receivers 860SA and 860SB, a second microwave combiner/splitter 863S and a second microwave dish 870S.

Teleconference system 800 operates as follows. First high speed teleconference station 810F operates as both a transmitting and receiving station. As a transmitting station, first high speed teleconference station 810F receives a first audio/video signal from a camera (not shown) at a first interface unit 830F which digitizes that signal to yield a first digital signal. First signal encoding/compression unit 843F receives the first digital signal and encodes and compresses it to yield a first compressed encoded signal which is asynchronous. First multiplexer 851F (used in reverse and hence serving as a demultiplexer) receives the first compressed encoded signal and splits it into first compressed encoded signals A and B which in turn are received by first protocol converters 855FA and 855FB, respectively. First protocol converters 855FA and 855FB output first synchronous signals A and B to first microwave transmitter/receivers 860FA and 860FB, respectively. First microwave transmitter/receivers 860FA and 860FB output modulated microwave signals A and B which are combined by first combiner/splitter 863F and then output to first microwave dish 870F as first modulated microwave signal A/B. First satellite modem demodulators 850FA and 850FB insure that the signals output from first microwave transmitter/receiver 860FA and 860FB are the same as the signals received by second microwave transmitter/receivers 860SA and 860SB, respectively. Second high speed teleconference station 810S operates in an analogous manner when transmitting a second modulated microwave signal A/B to be received by first high speed teleconference station 810F.

As a receiving station, first satellite dish 870F of first high speed teleconference station 810F receives a second modulated microwave signal A/B which is split (since they are travelling right to left in Figure 8) by first combiner/splitter 863F. First microwave transmitter/receivers 860FA and 860FB receive second modulated microwave signals A and B and demodulate these second modulated microwave signals A and B to yield resulting second synchronous signals A and B, respectively. First protocol converters 855FA and 855FB in turn output second compressed encoded signals A and B which are combined by first multiplexer 851F to yield a second compressed encoded signal. First decoding/decompression unit 841F decompresses and decodes the second compressed encoded signal and outputs a second audio/video signal which can be viewed on a television monitor (not shown). Second high speed teleconference station 810S operates in an analogous manner when receiving the first modulated microwave signal A/B from first high speed teleconference station 810F.

Figure 9 shows a high speed teleconference system 900 with a high speed teleconference station 910 which is analogous to first high speed teleconference station 810F as in Figure 8 but with a second high speed teleconference station 920 according to another embodiment of the invention. Those elements in Figure 9 common to Figure 8 have been given similar reference numbers. For example, high speed teleconference station 910 is the same as first high speed teleconference station 810F in Figure 8. HSD teleconference station 920 has a second interface unit 930S, a second signal decoding/decompression unit 941S, a second signal encoding/compression unit 943S, two second protocol converters 955SA and 955SB and CCIT 261 units 925A and 925B. As can be seen however, HSD teleconference station 920 does not have second satellite modem demodulators 850SA and 850SB, second microwave transmitter/receivers 860SA and 860SB, a second microwave combiner/splitter 863S or a second microwave dish 870S as shown in second high speed teleconference station 810S of Figure 8.

Instead, HSD teleconference station 920 is coupled to an HSD link 914 similar to HSD links 514 and 714 in Figures 4A and 7A, respectively. A line doubler and enhancer can be used to enhance a resulting "soft" picture signal output from second interface unit 930S. This signal can be passed on to a multi-scan (high density television capable) monitor (not shown).

HSD teleconference station 920 operates in the same manner as second high speed teleconference station 810S in transmitting second synchronous signals A and B from second protocol converters 855SA and 855SB and in receiving first synchronous signal A and B from first high speed teleconference station 810F. Here, however, CCIT units 925A and 925B each receives a 64 bps HSD signal from HSD link 914. CCIT units 925A and 925B in turn output the first synchronous signals A and B to two second protocol converters 955SA and 955SB, respectively.

Hardware Implementation

Various embodiments of the invention have been repeatedly tested at COMSAT headquarters at 810 L'Enfant Plaza, Washington, D.C., using the following equipment.

A DigitalFilm break out box made by SuperMac can be used to break down composite video to component video i.e., RGB signals, and consequently can serve as video demodulation units 631F, 631S, 731F and 731S. An Emotia converter can be used to down convert from high frequency computer display domain to analog studio RGB domain and consequently can serve as scan down converters 464, 635F, 635S, 735F and 735S. An NTL encoder takes an RGB computer domain signal and converts to lowest common denominator monitoring and/or recording, i.e., composite video, and consequently can serve as encoding units 633F, 633S, 733F and 733S. Motion J-PEG or AM-PEG compression chips by C-Cubed used with a SuperMac and Macintosh hardware/software package and a 2 Gigabyte dual array hard disk drive provides visually lossless high compression ratios for unmanaged full motion video and

consequently can serve as transmit signal processor 440 and receive signal processor 460.

As data enters from the computer domain to the rf communication architecture in the real world, the status of the data must be changed from asynchronous data to synchronous data and the electrical properties of connector pins associated with the transport of the signal must be changed accordingly. Both AM-PEG and J-PEG compression require level translation. However, J-PEG also requires state conversion of data between asynchronous and synchronous conversion, whereas AM-PEG data although asynchronous, is easily modified to become synchronous.

Black Box Model ASI-IV Protocol Converter changes asynchronous data terminal equipment (DTE) to communicate over a synchronous communication line. This converter allows asynchronous devices like terminals, PCs, and midrange computers to communicate using synchronous modems or multiplexers and consequently can serve as protocol converter 454T, 454R. RS-232 to V.35 Interface Converter by Black Box provides bi-directional conversion of all commonly used V.35 (synchronous world) and RS-232 (asynchronous world) equipment. The unit is designed for use as one port configured as DTE and the other port as DCE and consequently can serve as interface units 430, 830F, 830S, 930F and 930S. Also, Black Box ASI-IV Protocol Converter together with RS-232 to V.35 Interface Converter can serve as signal converters 450T, 855FA, 855FB, 855SA, 855SB, 955FA, 955FB, 955SA and 955SB.

TCS-9700 by Mobile Telesystems, Inc. in its full duplex high speed data configuration can serve as microwave transmitter 460T, microwave receiver 470, microwave transmitter/receivers 660F, 660S, 760S, 860FA, 860FB, 860SA, 860SB. The TCS-9700 includes a transmit modem for modulating a microwave signal to provide an uplink data stream.

COMSAT owns and operates earth stations for international L-Band based satellite communications and Inmarsat owns and operates a string of satellites circling the earth which provides

on demand high speed data channels for registered users. These channels are charged to a user on a time basis much like telephone lines for telephones.

COMSAT and Inmarsat provide a duplex high speed data microwave channel which requires a demodulator to effectuate a handshake and quality control (feedback). A Comstream Model 701 satellite modem completes the duplex architecture by acting as a demodulator and consequently can serve as satellite modems 459, 472, 650F, 650S, 750F, 850FA, 850FB, 850SA, 850SB, 950FA and 950FB.

A Compression Labs Inc. (CLI) device model Eclipse compresses and decompresses low and medium motion managed video with motion interpolation buffering to give a naturalness to motion and speech indistinguishable from real life and consequently can serve as CCIT units 925A, 925B. This results in a "soft" picture which can be "sharpened" or enhanced by line doubling. National Transcommunications Labs PAL/NTSC to HDTV Converter provides line doubling to create added detail and consequently can serve as line doubling and enhancer. The signal output from line doubling and enhancer can be passed on to a multi-scan (high density television capable) monitor.

Null modem 512 swaps wires so that "send" goes to "receive" and "receive" goes to "send" to allow transparent full duplex communications. Any standard null modem can accomplish this. DCU/DTE units 510R, 510T are provided by the telephone company in the region in which patch unit 580 is located.

"Digital Film, Professional Video Editing Studio in a Box" User Manual, SuperMac Technology, Inc., 1992, is incorporated herein by reference. "Macintosh User's Guide, for desktop Macintosh computers," Apple Computer, Inc., 1992, is incorporated herein by reference. "Adobe Premiere, User Guide," Adobe Systems, Inc., 1992, is incorporated herein by reference. "ASI-IV," January 1992, IC556A and IC556AE is incorporated herein by reference. "RS-232 V.35 Interface Converter," IC221A-R2, by Black Box Corporation, August 1992, is incorporated herein by

reference. "Model TCS-9700 Transportable Communications System, Operator's Manual" by Mobile Telesystems, Inc., Document 203890B, December 24th, 1992, is incorporated herein by reference. Chapter 2 of "CM701 PSK Digital Modem Operator's Manual," by ComStream is incorporated herein by reference.

Figure 10A shows a suitcase 1001 having a length L, width W and height H for housing any one of the embodiments described above and Figure 10B shows suitcase 1001 with an opened fabric microwave umbrella dish 1002. In particular, Figure 10A shows suitcase 1001 having a bottom portion 1004, a lid 1006 and a handle 1008. The length L, width W and height H of suitcase 1001 housing the above embodiments has been made smaller than 25 by 24.5 and 16 inches, respectively. Suitcase 1001 is light enough that a person of average strength can easily carry it by handle 1008. That is, all of the above embodiments can be housed in suitcase 1001 and consequently are portable.

Figure 10B shows suitcase 1001 with opened umbrella dish 1002. Microwave umbrella dish 1002 has a diameter of about 1.2 meters when opened. Figure 10B shows umbrella dish 1008 to be slanted at an elevation angle E and ready to transmit and/or receive microwave signals.

The following discussion relates to a news distribution system in which any of the above discussed integrated communications systems can be used. Figure 11A shows a digital network 100 having a digital information distribution system 104 according to one embodiment of the invention. Digital information distribution system 104 includes a hub receiver 106 having a master CSU/DSU 108, a distribution amplifier/equalizer 112 and a plurality of CSU/DSUs 116. CSU/DSUs are communications units which perform hand-shaking functions to initiate communications between synchronous digital equipment. One example of a CSU/DSU unit is a CSU/DSU model 1056S from Integrated Network Corporation (I.N.C.). Digital information distribution system 104 further includes a master controller 126 having a master controller display 128 and a master controller

keypad 132. Master controller 126 is connected to the plurality of CSU/DSUs 116 via one or more RS-232 lines 135. Digital information distribution system 104 also includes a first backup unit 134 having a first backup hard disk 134a and a second backup unit 136 having a second backup hard disk 136a. Backup unit 134 is connected to hub receiver 106 via RS-232 line 138. Second backup unit 136 is connected to first backup unit 134 via RS-232 line 139. Digital information distribution system 104 also has a recorder 144 connected to hub receiver 106 via RS-232 line 146.

Digital information distribution system 104 operates as follows. A suitcase transmission unit 150, such as the suitcase described above, gathers a video clip, compresses that clip and then transmits or uplinks that clip to a satellite system 160 which may include one or more satellites and one or more earth stations. Satellite system 160 eventually downlinks the compressed video news clip to an earth station 164 which is coupled to a land network 170 such as ACUNET. Land network 170 can include microwave links, hard wire links and optical fiber links. Land network 170 is a synchronous digital system and consequently is coupled to hub receiver 106, and in particular, to master CSU/DSU 108 via a V.35 pin input 174 which receives line 176. Synchronous (V.35) line 178 interconnects master CSU/DSU 108 to distribution amplifier/equalizer 112.

Digital network 100 transmits digital information corresponding to a news clip from a camera (not shown) which can serve as a news clip for television and other audio/video media. Alternatively, the digital information can serve as a series of still photographs for printed media.

Figure 11B shows a transmission system 410 which can be used to transmit video clips from remote locations. Transmission system 410 includes an interface unit 430 which receives an analog audio/video signal from a camera (not shown) and transforms that analog audio/video signal into a digital red, green, blue (RGB) signal. Interface unit 430 demodulates the audio/video signal which can be a NTSC, PAL or SECAM signal and

outputs the digital RGB signal. The digital RGB signal is received by a transmit signal processor 440 which compresses the digital RGB signal into an asynchronous compressed signal and stores that asynchronous compressed signal on a hard disk 440A. Transmit signal processor 440 can then output the asynchronous compressed signal which, in turn, is received by a signal converter 450T.

Signal converter 450T includes a protocol converter 454T and a level translation unit 458T. Protocol converter 454T receives the asynchronous compressed signal and converts that signal to a synchronous compressed signal. The synchronous compressed signal is then input to level translation unit 458T which translates it into a level translated synchronous compressed signal ready to be received by a microwave transmitter 460T (see Figure 11B) which is part of digital network 100.

Returning to Figure 11A, digital information distribution system 104 distributes digital information such as a compressed video news clip or a series of still pictures as follows. The compressed video news clip is input to master CSU/DSU 108 via line 176 which receives a synchronous digital data stream and performs handshaking functions. These handshaking functions initiate communications between network 170 and distribution amplifier/equalizer 112. Master CSU/DSU 108 then outputs the synchronous digital signal which is received by distribution amplifier/equalizer 112. Distribution amplifier/equalizer 112 then splits up the resulting synchronous signal and outputs a plurality of synchronous signals to each of the plurality of CSU/DSUs 116 via output lines 180. Each of the plurality of CSU/DSUs 116 is coupled into land network 170 (redrawn at the bottom of Figure 11A) via lines 172 which in turn are coupled to receiving stations 184. Alternatively, if no digital network (e.g., ACUNET) is available, remote suitcases 188 can be used as receiving stations as described above.

First and second backup units 134 and 136 function as a digital receiving system similar to digital receiving system 510

as discussed above and shown in Figure 4A. In particular, referring to Figure 11C, backup units 134 and 136 include a signal converter 550R followed by a receive signal processor 460. Signal converter 550R includes level translation unit 558R followed by a receive signal processor 460. Signal converter 550R is followed by protocol converter 454R. A high speed digital (HSD) signal is received on line 516' by signal converter 550R. Level translation unit 558R in turn translates the voltage level of that high speed digital signal for transmission on serial line 456R as a synchronous compressed signal. Protocol converter 454R then receives and transforms this synchronous compressed signal into an asynchronous, compressed signal for transmission on a bus 446 to receive signal processor 460. Receive signal processor 460 decompresses this asynchronous, compressed signal on hard disk 460A'. If the decompression of the asynchronous compressed signal received by signal processor 460 is the inverse of the compression which the digital clip underwent at transmission unit 150, receive signal processor 460 outputs a digital signal corresponding to the news clip output from the camera at transmission unit 150.

Figure 12 shows digital information distribution system 104 in more detail. Again, land network 170 is coupled to master CSU/DSU 108 via line 176. V.35 unit 174 is coupled to master CSU/DSU 108 via synchronous line 178. V.35 input 174 is in turn coupled to a synchronous-to-asynchronous converter 210 (such as converter 450T in Figure 11B) in distribution amplifier/equalizer 112. Distribution amplifier/equalizer 112 further includes outputs 230 and 234 connected to recorder 144 and backup unit 134 via RS-232 lines 146 and 138, respectively. Distribution amplifier/equalizer 112 also has an input 242 for receiving the backup signal from backup unit 134 or backup unit 136. The plurality of CSU/DSUs 116 have respective output cables 217 which are coupled to receiving stations 184 of Figure 11A.

Master controller 126 is coupled to the plurality of CSU/DSUs 116 via RS-232 line 220. RS-232 line 220 can be a

bundle of individual RS-232 lines, wherein each line is connected to a different CSU/DSU, or each of the plurality of CSU/DSUs 116 can have a unique address, in which case line 220 can be a single RS-232 line. Distribution amplifier/equalizer 112 also has an input 242 for receiving a backup signal via RS-232 line 239 from backup unit 134 or backup unit 136. This backup signal is received by backup unit 134 or backup unit 136 at the same time it is transmitted out of distribution amplifier/equalizer 112 to CSU/DSUs 116.

Master controller 126 sends commands to the plurality of CSU/DSUs on RS-232 line 220. These commands can be entered using master controller keypad 132. The plurality of CSU/DSUs 116 can send commands to master controller 126 indicating which, if any, CSU/DSU in the plurality of CSU/DSUs 116 did not receive the news clip, or received a news clip with more than a predetermined number of errors.

Figures 13A and 13B show a rear and a front view, respectively, of distribution amplifier/equalizer 112. Distribution amplifier/equalizer 112 has a housing 304 (Figure 13B) with a rear panel 310 and a plurality of outputs 316 coupled to the plurality of CSU/DSUs 116 via lines 117. Figure 13B shows that distribution amplifier/equalizer 112 has a display 324 and a keypad 328 for manually controlling which particular lines 117 and consequently which particular CSU/DSU of the plurality of CSU/DSUs 116 are activated.

Figure 14 shows master controller 126 connected to the plurality of CSU/DSUs 116 via RS-232 lines 220. Here, a separate RS-232 line is connected to a respective CSU/DSU. However, as discussed above, a single RS-232 line can be connected to the plurality of CSU/DSUs 116, if CSU/DSUs 116 are separately addressable. Again, an operator sends commands to the CSU/DSU 116 by entering commands into master controller 126 using keypad 132 and then master controller 126 in turn sends these commands along the appropriate RS-232 line 220. Also, a particular CSU/DSU 116 can send information back to master controller 126

along the appropriate RS-232 line 220. The plurality of CSU/DSUs 116 can have transmission rates varying from 9.6 kilobytes/s (corresponding to normal telephone line rates) up to 2 Megabytes/s (corresponding to special high speed data line rates). It should be understood, however, that hub receiver 106 can couple to very low rate telephone lines such as telephone lines having rates of 2.4 kilobits/s presently found in some undeveloped countries. Also, the plurality of CSU/DSUs 116 can be connected in parallel. Consequently, multiples of such 9.6 kilobyte can be multiplexed to yield a "virtual" 54 kilobyte line or a virtual 64 kilobyte line.

Figure 15 shows an on-demand video news distribution system 500′ according to another embodiment of the invention. System 500′ includes a video menu unit 504′ coupled to a telephone line unit 508 (corresponding to distribution amplifier/equalizer 112 in Figures 11A and 12) via line 512′. Telephone line unit 508 has a plurality of output lines 514′ which in turn are coupled to a plurality of menu CSU/DSU units 516′. This plurality of menu CSU/DSU units are in turn coupled to network 520 (corresponding to land unit 170 of Figure 11A) via menu lines 524.

Video news distribution system 500′ includes a plurality of units 525A-525H similar to backup units 134 of 136 of Figure 11A interconnected via bus 526. Each unit 525A-525H corresponds to a different news topic or subject matter. For example, unit 525A could correspond to current affairs in Japan, Unit 525B could correspond to events in Germany, unit 525C could involve information regarding international financing, and unit 525D could be sports information. Each of the plurality of units 525A-525H includes respective memories 527A-527H such as a hard disk in which digital information can be stored. The plurality of video clip storing units 525A-525H are coupled to distribution amplifier/equalizers 531A-531H via synchronous lines 529A-529H, respectively. Distribution amplifier/equalizers 531A-531H like distribution amplifier/equalizer 112 of Figure 11A and Figure 12

has multi-line outputs 533A-533H which are respectively coupled to CSU/DSU units 535A-535H. For example, distribution amplifier 531A has three multi-line outputs 533A coupled to CSU/DSU units 535A. Similarly, CSU/DSU units 535A-535H correspond to the plurality of CSU/DSUs 116 of Figure 11A. CSU/DSU units 535A-535H are all coupled to network 520 in the manner discussed above with reference to Figure 11A.

Video news distribution system 500′ operates as follows. Users at television stations or a newspaper or magazine printing houses 550A-550C dials the telephone number of video menu unit 504′ using computers 555A-555C (such as a personal computer with a modem), respectively, which establish communications with menu unit 504′. A connected user can then view a menu listing the various clips and/or still photographs available on units 525A-525H. If the user wishes to obtain a particular clip, he or she simply enters a command to menu unit 504′ which in turn sends a "request-to-send" command to the appropriate video storing unit 525A-525H. The video storing unit with that video clip or photograph then sends the video clip (photograph) via its corresponding distribution amplifier/equalizers 531A-531H via one of the corresponding CSU/DSU units 535A-535H. For example, if a user of computer 555A wants to receive a news clip on Japan which is stored in unit 525A, the user sends a command to menu unit 504′ via one of the menu CSU/DSUs 516′ and menu amplifier/equalizer 508. Menu unit 504′ then sends a command to unit 527A via bus 526, to send that particular clip to computer 555A via amplifier/equalizer 531A. If a second user at station 550B is currently acquiring that or a different clip from unit 525A and consequently is using one of the CSU/DSUs 535A, unit 525A uses the CSU/DSU 535A which is not being used.

The following discussion relates to a mobile global communications system which can also use any of the integrated communications systems discussed in relation to Figures 1A-10B. Figure 16A shows a vehicle 300 with a communications system 301 which includes signal processor 303V according to one embodiment

of the invention. Top portion 300a of vehicle 300 is built of fiber glass or other material that passes microwaves whereas bottom portion 300b need not. Alternatively, top portion can be made to open thereby allowing microwave transmission from vehicle 300. Vehicle 300 can have bullet proof panels 302' built into sides 300c.

Vehicle 300, communications system 301 and signal processor 303V make up global satellite communications vehicle 305. Communications system 301 is visible here only because vehicle 300 has been cut open in Figure 16A. Typically, however, communications system 301 will not be visible from outside of vehicle 300.

Figure 16B shows global satellite communications vehicle 305 together with remote digital suitcase systems 307R1, 307R2 and 307R3. Each remote digital suitcase system is capable of communicating with communications system 301 on vehicle 300 via links L1, L2 or L3. In addition, remote digital suitcase systems 307R1, 307R2 and 307R3 can communicate directly with satellite 309 via satellite link 1 (SL1), satellite link 2 (SL2) and satellite link 3 (SL3), respectively, in a manner similar to that discussed above with respect to the integrated communications systems. Remote digital suitcase systems 307R1-307R3 can further communicate via multiple phone links (MPL1-MPL3), respectively, via with mobile phone satellite (MPSAT") 311. Communications system 301 has a vehicle satellite link (VSL) with satellite 309 as well as a vehicle mobile phone link (VMPL) with mobile phone satellite 311.

Communications between remote digital suitcase 307R1 can be achieved in one or more of the following manners. Communications system 301 can transmit and receive via link VSL to satellite 309 and then via satellite link 1 (SL1) to remote digital suitcase system 307R1. Alternatively, communications system 301 can transmit and receive information via vehicle mobile phone link VMPL to mobile phone satellite 311 and then to and from remote digital suitcase system 307R1 via mobile phone link 1 (MPL1).

Communications system 301 can also transmit and receive via links L1-L3 to or from remote digital suitcase systems 307R1-307R3, respectively.

Links L1-L3 can be wide band microwave links or wide band optical links. Hence, links L1-L3 can transmit and receive high quality broadcast audio/video information. Satellite links SL1-SL3 and VSL can be L band satellite communication links. Consequently, high quality (broadcast quality) audio/video information as well as any other type of information can be transmitted to and from communications system 301 as well as remote digital suitcase systems 307R1-307R3. The remaining mobile phone links, i.e., MPL1-MPL3 as well as VMPL are narrower bandwidth lengths which can transmit and receive audio information.

Figure 16B also shows a second global satellite communications vehicle 305′ with a vehicle 300′, communications system 301′ and digital stations 303V′ corresponding to those of vehicle 305. Second global satellite communications vehicle 305′ has a second vehicle satellite link (VSL′) which provides a communications link with satellite 309. Hence, global satellite communications vehicle 305 can communicate with second global satellite communications vehicle 305′ via satellite links VSL and VSL′, and vice versa. In addition, remote digital suitcase systems 307R1-307R3 can communicate with second global satellite communications vehicle 305′ via satellite links SL1-SL3, respectively, and satellite link VSL′ without ever transmitting to global satellite communications vehicle 305.

Global satellite communications vehicle 305 as well as remote digital suitcase systems 307R1-307R3 can also communicate with similarly equipped vehicles or an earth station 313 via an earth station satellite link (ESSL). Earth station 313 can further have a digital high speed data (DHSD) link 317 to a building 319 which has a signal processor 303B or a high speed digital station (such as digital station 510 to be discussed below) via DHSD link 317. Consequently, high quality audio/video

information can be transmitted between communications system 301 and: 1) remote digital suitcase systems 307R1-307R3; 2) second global satellite communications vehicle 305'; 3) earth station 313; and 4) signal processor 303B. Similarly, remote digital suitcase systems 307R1-307R3 can communicate with: 1) each other; 2) second global satellite communications vehicle 305'; 3) earth station 313; and 4) signal processor 303B.

Figure 16C shows remote digital suitcase system 307R1 with a microwave umbrella dish 321R1 open. Umbrella dish 321R1 is shown slanted at an angle E and ready to transmit and/or receive microwave signals. Here, 307R1 corresponds to transmission system 410 above. The portion of remote digital suitcase system 307R1 which does not include umbrella system 321R1 is the same as digital station 303V in Figure 16B and corresponds to high speed data line receiving system 510 in Figure 4A.

Figure 17 shows a somewhat more detailed diagram of global satellite communication vehicle 305. Here, however, transportable suitcase 510R1 corresponds to 510 of Figures 4A and 16C. That is, transportable suitcase 510R1 corresponds to remote digital suitcase system 307R1 (Figure 16B) without umbrella dish 321R1 (Figure 16C). As can be seen, mobile phone link (MPL1) as well as vehicle mobile phone link (VMPL) are as in Figure 16B. However, vehicle satellite links (VSL) shown in Figure 16B are actually of two kinds, namely, an L-band standard A satellite link, as well as an L-band standard M or B satellite link. In addition, a global positioning system (GPS) link is shown to a global positioning system (GPS) satellite 509.

Global satellite communications vehicle 305 includes an antenna system 1504 including a GPS antenna 1504a and an Inmarsat C antenna 1504b and a transmitter/receiver 1508 which includes a passive GPS receiver 1508a and an Inmarsat C transmitter/receiver 1508b (see Figure 18). The Inmarsat C transmitter/receiver 1508b can transmit all GPS derived vehicle coordinates to headquarters or any other Inmarsat C receive capable site. Hence, GPS receiver 1508a determines GPS vehicle

coordinates and since the Inmarsat C transmitter/receiver 1508b can in turn transmit this GPS information, the combination of GPS receiver 1508a and Inmarsat C transmitter/receiver 1508b will be referred to as transmitter/receiver 1508.

Communications vehicle 305 also has a tracking dish 1512 which transmits and receives information to and from satellite 309 using standard A communications. In addition, an antenna array 1516 transmits and receives information to and from satellite 309 via a standard M link or a standard B link (once it becomes available). This and other equipment will be discussed in more detail below. First, however, transportable suitcase 510R1 will be discussed in more detail.

Transportable suitcase 510R1 includes a cordless phone receiver 1522 as well as a cordless phone 1526. This enables a person operating transportable suitcase 510R1 to communicate with global satellite communications vehicle 305 without having to remain in the close proximity of transportable suitcase 510R1. Figure 17 further shows a transmitter/receiver 1530 which communicates with an antenna 1517 via link L1. Transmitter/receiver 1530 can be, for example, a microwave transmitter/receiver and L1 can be a wide band microwave link or even an optical link. Transmitter/receiver 1530 is coupled to a plurality of sensors such as sensor A 1530A, sensor B 1530B and sensor C 1530C which are electrically coupled via 1532A, 1532B and 1532C, respectively, to microwave transmitter/receiver 1530. Information acquired by any one of sensors 1530A-1530C is transmitted from transmitter/receiver 1530 to antenna 1517. Similarly, information desired to be sent from communications vehicle 305 to transportable suitcase 510R1 is sent from antenna array 1516 via link L1 to transmitter/receiver 1530 which in turn outputs the demodulated signal to one of sensors 1530A-1530C.

Sensor 1530A can be a video camera which acquires video information in the location of transportable suitcase 510R1 and sends that information to transmitter/receiver 1530. In this case, transportable suitcase 510R1 includes a digital signal

processor 510 as discussed above, the video information acquired by sensor 1530A can be digitized and compressed before it is sent to antenna array 1516 via transmitter/receiver 1530. Other examples of sensors which acquire information at the location of transportable suitcase 510R1 include any sort of medical sensing equipment.

Any one of sensors 1530A-1530C can also operate as information receiving equipment which receives information from communications vehicle 305. For example, sensor 1530C could be a pair of high density liquid crystal display goggles which can be worn by an individual while working at the remote location of transportable suitcase 510R1.

Two types of antennas are shown in Figure 17. Namely, tracking dish 1512 and antenna array 1516 as discussed above. These two systems utilize information received from transmitter/receiver 1508 (recall that transmitter/receiver 1508 includes a GPS receiver as well as an Inmarsat C transmitter/receiver) to ensure tracking with satellite 309. The interrelationship between various components some shown and some not shown in communications vehicle 305 will be discussed with reference to Figure 18.

Figure 18 shows various equipment and how they are interconnected in communications vehicle 305. That is, Figure 18 is a block diagram of communications system 301 with digital station 303V as shown in Figure 16A. As can be seen, digital station 303V is connected via cable 1602 to standard A antenna terminal and RF generator 1604. Digital information received via cable 1602 from high speed digital station 303V is used to generate microwave signals which are then transmitted to standard A antenna assembly 1512 via microwave guide 1608 and subsequently transmitted from antenna 1512 to satellite 309 (Figure 17 or Figure 16B). An example of standard A antenna terminal and RF generator is Inmarsat A MCS-9120.

High speed digital station 303V is also connected to standard M or B terminal and RF generator 1614 via cable 1616.

Standard M or B terminal and RF generator 1614 in turn is coupled to standard M or B array antenna 1516 via microwave guide 1618. Digital information is received from high speed digital station 303V via cable 1616 by standard M or B terminal 1614 and processed to yield microwave signals which in turn are transmitted via microwave guide 1618 to array antenna 1516 and then out to satellite 309. An example of a standard M antenna terminal and RF generator is Inmarsat M or TerraStar-M, and a standard B antenna terminal and RF generator is the Satphone Model SP 1600.

Transmitter/receiver system 1508 is also coupled to high speed digital station 303V via cables 1624 (lines 1624a and 1624b). GPS antenna 1504a receives GPS signals through line 1628a to GPS receiver 1508a which processes the GPS signals and outputs GPS digital information to high speed digital station 303V. Inmarsat standard C transmitter/receiver 1508b is coupled to high speed digital station 303V via cable 1624b and antenna 1504b is coupled to standard C transmitter/receiver 1508b. Standard C transmitter/receiver 1508b can receive information via standard C antenna 1504b and cable 1628b from any Inmarsat C equipped station. Standard C transmitter/receiver 1508b can then transmit the GPS information to any Inmarsat C equipped station which forwards this information to an end user by the local telephone company. Alternatively a TransVideo Electronics (TVE) patch system such as the patch system described above can be used to patch the standard C transmitter/receiver to the end user.

Standard A antenna terminal 1604 as well as standard M or B terminal 1614 can maintain satellite communications with satellite 309. Alternatively, station 303V can also process this GPS information and output commands to standard A antenna terminal 1604 as well as standard M or B terminal 1614 to enable both terminals to adjust their respective antennas as vehicle 300 moves from location to location. An example GPS receiver with a standard C transmitter/receiver (i.e., system 1504) is Global-C

MDT-6000 by Mobile Telesystems which is a global C standard system with a GPS option.

High speed digital station 303V is further coupled to microwave antenna control and RF generator 1630 via cable 1632. Microwave antenna control and RF generator 1630 in turn is coupled to microwave antenna 1517 via microwave guide 1634. Video or any other sensor information is received from transportable suitcase 510R1 via link L1 by microwave antenna 1517 and then transmitted through wave guide 1634 to microwave antenna control and RF generator 1630 which demodulates that information and transmits resulting digital information via cable 1632 to high speed digital station 303V. Similarly, digital video information from high speed digital station 303V can be transmitted via cable 1632 to microwave antenna control and RF generator 1630 which in turn outputs microwave on microwave guide 1634 to microwave antenna 1517 and microwave antenna 1517 in turn transmits microwave information via link L1 to transportable suitcase 510R1. This digital information can be received from first equipment 1640A or second equipment 1640B or third equipment 1640C which output digital signals on bus 1644 to high speed digital station 303V. Similarly, video information can be output from camera 1648 to bus 1644 and then to digital station 303V. Digital information output from equipment 1640A-1640C or from camera 1648 onto bus 1644 can be received by digital station 303V and in turn transmitted from digital station 303V to satellite 309 via one of standard antenna terminal and RF generator 1604 and a standard M or B terminal and RF generator 1614 as discussed above. However, any such digital information is compressed in high speed digital station 303V before being output to satellite 309 in a manner analogous to that discussed above as will be shown with reference to Figure 19 below.

Figure 19 shows a more detailed block diagram of high speed digital station 303V and its relation to standard M/B subsystem 1702 comprised of antenna array 1516 and antenna array terminal 1614, as well as standard A subsystem 1704 comprising antenna

1512 and antenna terminal 1604. A video receiver and display 1710 is coupled to high speed digital station 303V which is comprised of a signal converter similar to signal converter 450T as well as a receive signal processor 460.

High speed digital station 303V interacts with standard A subsystem 1704, standard M/B subsystem 1702 and GPS receiver controller 1508 as follows. Remote A microwave signals are received from a satellite (satellite 309 of Figure 16B) by standard A subsystem 1704 and in particular antenna 1512. Standard A subsystem 1704 receives remote A microwave signals and transforms them into first remote digital signals (or data) which are output to high speed digital station 303V. Signal converter 450T then converts first remote digital signals (or data) to first asynchronous compressed remote digital signals (or data) and outputs those signals to receive signal processor 460. Receive signal processor 460 then decompresses the first asynchronous compressed remote digital signals (or data) and outputs first decompressed remote digital data to video receiver and display 1710 for display.

Remote M/B microwave signals are processed in a similar manner. Namely, remote M/B microwave signals are received from a satellite (satellite 309 of Figure 16B) and are transformed by standard M/B subsystem 1702 into second remote digital signals (or data). High speed digital station 303V receives these second remote digital signals (or data) at converter 450T and the latter converts those signals into second asynchronous compressed remote digital signals (or data). Receive signal processor 460 then receives the second asynchronous compressed remote digital signals (or data) and decompresses them and outputs second decompressed remote digital data to video receiver and display 1710 for display.

Microwave signals are output from communications system 301 as follows. Local information is input to high speed digital station 303V at input 1720. As discussed above, this can be information gathered by a video camera which is in vehicle 300

or which is remote to vehicle 300 (one of sensors 1530A-1530C of Figure 17) coupled thereto by microwave link L1. High speed digital station 303V includes an analog to digital (A/D) converter 1726 which converts the local information to local digital information. This local digital information serves as either first decompressed local digital data or second decompressed local digital data which are eventually sent to satellite 309 by standard A subsystem 1704 or standard M/B subsystem 1702, respectively. For example, first decompressed local digital data is received by receive signal processor 460 which compresses that data and outputs first asynchronous compressed local digital data. First asynchronous compressed local digital data is then received by signal converter 450T and converted into first local digital signals which are received by standard A subsystem 1704. Standard A subsystem 1704 converts the first local digital signals and outputs local A microwave signals to satellite 309.

Similarly, second decompressed local digital data is received by receive signal processor 460 and compressed into second asynchronous compressed local digital signals. Those second asynchronous compressed local digital signals are in turn received by signal converter 450T and converted into second local digital data. Standard M/B subsystem 1704 receives the second local digital data and converts them into local M/B microwave signals which are output to satellite 309. In all of the above cases, microwave signals are compressed and decompressed in high speed digital station 303V and in particular in receive signal processor 460. In particular, all local microwave signals are signals which are compressed at receive signal processor 460 and will eventually be decompressed at a similar receive signal processor at a remote location. On the other hand, all remote microwave signals which are received from a receive signal processor in a high speed digital station at a remote location are decompressed by high speed digital station 303V and in particular receive signal processor 460. Consequently, remote

microwave signals cannot be decompressed by receive signal processor 460 unless they underwent a corresponding compression at the remote location. Therefore, remote microwave signals cannot be intercepted by either a standard A subsystem or a standard M/B subsystem unless the receiving party knows the decompression algorithm used by the transmitting party. This is even more so the case if the receive signal processor at the remote location utilizes a digital encoding/scrambling algorithm. In such cases, even if the compression and decompression algorithms are known, the remote microwave signals cannot be processed into local digital information until a corresponding decoding and descrambling algorithm is performed on the decompressed digital data.

Figure 20 shows an alternate approach to coupling sensors 1530A-1530C to array 1517 via link L1. Namely, Figure 20 shows three separate microwave transmitter/receivers 1830A-1830C for sensors 1530A-1530C, respectively. Here, link L1 is comprised of three separate links LA1, LB1, and LC1 for transmitter receivers 1830A, 1830B and 1830C, respectively. Again, sensor 1530A can be a video camera which has a transmitter/receiver 1830A mounted either directly on camera 1530A or elsewhere, such as on a belt worn by an operator of camera 1530A.

Since each suitcase (307R1-307R3 of Figure 16B) includes receive signal processors 440 or 460, any information transmitted from those remote digital suitcase systems can be compressed and/or encoded or scrambled. In so doing, communications between remote digital suitcase systems 307R1-307R3 can remain secure. Alternatively, transmitter/receiver 1830A-1830C can still provide secure communications if instead of transmitting microwaves, sensors 1830A-1830C transmit infrared or optical laser signals with the information modulated thereon. In such cases, since the diffraction of laser light would be significantly smaller than diffraction from microwave transmitters (i.e., the laser radiation would be transmitted in "beams"), communications between sensors 1530A-1530C and transmitter/receiver 1517 would

remain secure even without any scrambling or encoding unless they were directly intercepted (line of site) by a similar optical transmitter/receiver.

Figure 21A shows a suitcase or housing 700′ with a lid 710′ and a bottom portion 714′ for housing any one of the integrated satellite communications systems discussed above according to one embodiment of the invention and Figure 21B shows housing 700′ with lid 710′ removed. Referring to those figures, housing 700′ has a handle 720′ which can be used to carry housing 700′ from one location to another. Figure 21B shows equipment or components 724′ of communications system 730′ housed in housing 700′. Communications system 730′ can be transmission system 410 or receiving system 420 in Figure 3A, high speed data line receiving system 510 in Figure 4A or either first teleconference station 610F or second teleconference station 610S′ of Figure 6A.

Bottom portion 714′ of housing 700′ has sides 736′. Each of these sides 736′ of bottom portion 714′ of housing 700′ has a holding ledge (see, e.g., Figure 22B) welded thereto. A plate 750′ rests on all four sides of the holding ledge and all components or equipment 724′ is either directly or indirectly attached to plate 750′.

Figure 22A shows plate 750′ and Figure 22B shows bottom portion 714′ as viewed from above with plate 750′ resting on ledge 760′. Plate 760′ has a top 765T′ and a bottom 765B′ with edges 770′. Plate 760′ also has holes 810′ which make it possible to secure equipment 724′ onto plate 760′. Referring to Figure 22B, plate 750′ fits within bottom portion 714′. In particular, a spacing 820′ of approximately a few millimeters to over one inch exists between the interior of sides 736′ of bottom portion 714′ and edges 770′ of plate 750′. A part of holding ledge 760′ is shown with dashed lines because plate 750′ is resting on top of holding ledge 760′.

Plate 750′ can be made of any material which when cut length L width W and thickness T is somewhat flexible. However, it is desirable that plate 750′ slightly bend due to the weight of

equipment 724', as shown in Figure 23. To achieve this, plate 750' can be made of aluminum 50/51 approximately 30 to 100 mils thick and preferably 70 mils thick.

In particular, Figure 23 shows a view along axis A of Figure 22B with equipment 724' attached thereto. Note that although holding ledge 760' appears as separate pieces in Figure 23, it is actually one ledge that runs along all four sides 736' of bottom portion 714', as shown in Figure 21A. Figure 23 further shows screws 901' which run through plate 750' and an additional rubber strip 905' which rests atop ledge 760'. Plate 750' has slots 908' (see Figure 22B) through which screws 901' pass, thereby allowing plate 750' to flex under the weight of equipment 724'. Screws 901' are secured on the underside of holding ledge 760' by nuts 909'. Slots 908' are approximately a few millimeters to over a centimeter in length. Rubber strip 905' is approximately a few millimeters to over 3/4 inches in width and about a few millimeters thick up to over about 1 centimeter thick and can be made of a compressible material such as Neoprene.

Figure 24 shows a close-up view of ledge 760' together with bottom portion 714' of housing 700'. Ledge 760' is welded to side 736' and in particular to a metallic rim 736R'. Figure 24 also shows a close-up view of spacing 820' discussed with reference to Figure 22B. In addition, Figure 24 shows a side view of an O-ring acceptor 1002' which runs along all four sides 736' of bottom portion 714'. An O-ring 1006' rests within O-ring acceptor 1002' all the way around the top of bottom portion 714'. O-ring 1006' together with O-ring acceptor 1002' help provide a moisture proof seal.

Figure 25 shows a close-up view of how lid 710' rests on bottom portion 714' of housing 700'. Lid 710' also has sides 746' that correspond to sides 736' of bottom portion 714'. Side 746' of lid 710' has an O-ring acceptor matching piece 1102' which meets O-ring 1006' and conforms to the shape of O-ring acceptor 1002'. As can be seen, when lid 710' is closed, O-ring

acceptor matching piece 1102′ and O-ring acceptor 1002′ form a moisture tight seal with O-ring 1006′. O-ring acceptor 1002′ and O-ring acceptor matching piece 1102′ can be made of a metal such as aluminum.

Figure 26A shows a basket frame 1202′ which is attached to the underside of plate 750′ at locations 1208′. Although bottom portion 714′ is not shown in 26A, frame 1202′ does not come into contact with bottom portion 714′. That is, spacing 820′ (Figure 22B) exists between sides 736′ of bottom portion 714′ and frame 1202′. Frame 1202′ has corner supports 1214′, bottom supports 1218′ and top supports 1222′. Only top supports 1222′ are secured to plate 750′. Four perforated side panels 1232′ as well as a perforated bottom panel 1234′ can slide into frame 1214′. This makes it convenient to service components by replacing entire panels of components by merely sliding the panel with a defect out and replacing it with a new panel and sending the damaged panel back to be serviced.

Side panels 1232′ and bottom panel 1234′ can be aluminum plates and panel holes 1238′ can be used to secure components 1240′ using screws. Components 1240′ are part of equipment 724′. Rubber cushions 1246′ provide additional shock absorbing capability between plate 750′ and frame 1214′ and consequently between components 1240′ and bottom portion 714′ of housing 700′.

Figure 26B shows frame 1214′ as viewed from the side without side panels 1218′. Components 1260′ which require even further isolation from external forces to housing 700′ are secured to perforated bottom panel 1234′ with their own rubber cylinders 1264′. Component 1260′ can be for example a hard disk drive which requires significant protection from external forces. Component 1260′ is secured to perforated bottom panel 1234′ with screws 1270′ which pass through panel holes 1238′ cushioned by rubber cylinders 1264′. Consequently, components 1260′ have the most isolation from shock or external forces incident on housing 700′.

Summarizing the hierarchy of isolation from external forces to housing 700′, components have a first level of isolation when they are attached directly to plate 750′ which is isolated from lid 710′ and from sides 736′ and bottom portion 714′ by spacing 820′ and which rests on holding ledge 760′ having cushioned strip 905′. A next level of isolation is achieved by attaching components to plate 750′ with the addition of a rubber cylinder 933′. An even higher level of isolation is achieved when components are attached to frame 1214′ which itself is isolated from plate 750′ via rubber cushions 1246′. The highest level of isolation is achieved by attaching the most sensitive components (such as hard disk drives) to perforated bottom panel 1234′ and isolating those components from bottom panel 1234′ using rubber stops 1264′.

Numerous and additional modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise as specifically claimed.

WHAT IS CLAIMED IS:

1. A portable integrated transmission system, comprising:

transmit interface means for transforming an analog signal into a digital signal;

transmit signal processing means for compressing said digital signal into a compressed asynchronous signal;

transmit signal converting means for converting said compressed asynchronous signal into a compressed synchronous signal; and

microwave transmitting means for generating a microwave signal and modulating said microwave signal with said compressed synchronous signal to provide a modulated microwave signal and for transmitting said modulated microwave signal.

2. The portable integrated transmission system as claimed in claim 1, wherein said transmit signal processing means comprises video editing means for editing said digital signal.

3. The portable integrated transmission system as claimed in claim 1, further comprising a satellite modem demodulating means coupled to said microwave transmitting means and said transmit signal converting means for correcting errors in said modulated microwave signal.

4. The portable integrated transmission system as claimed in claim 1, further comprising housing means for housing said transmit signal interface means, said transmit signal processing means, transmit signal converting means and said microwave transmitting means.

5. The portable integrated transmission system as claimed in claim 4, further comprising a handle attached to said housing means for carrying said housing means.

6. The portable integrated transmission system as claimed in claim 4, wherein said housing means is a suitcase.

7. The portable integrated transmission system as claimed in claim 1, wherein said microwave transmitting means comprises microwave generating means for generating said microwave signal and microwave antenna means for transmitting said modulated microwave signal.

8. The portable integrated transmission system as claimed in claim 7, wherein said microwave generating means comprises an L-band microwave generator.

9. The portable integrated transmission system as claimed in claim 7, wherein said microwave antenna means comprises a fabric satellite dish.

10. The portable integrated transmission system as claimed in claim 9, wherein said satellite dish comprises a collapsible satellite dish.

11. The portable integrated transmission system as claimed in claim 1, wherein said transmit signal processing means comprises memory means for storing said compressed asynchronous signal.

12. The portable integrated transmission system as claimed in claim 1, wherein said transmit interface means comprises an encoder.

13. The portable integrated transmission system as claimed in claim 1, wherein said transmit signal converting means comprises an RS-232 to V.35 interface converter.

14. The portable integrated transmission system as claimed in claim 1, wherein said transmit signal converting means comprises an asynchronous to synchronous interface converter.

15. The portable integrated transmission system as claimed in claim 1, wherein said transmit interface means comprises an analog-to-digital converter.

16. A portable integrated receiving system, comprising:

microwave receiving means for receiving a modulated microwave signal which has been modulated with a compressed synchronous signal and for demodulating said modulated microwave signal into said compressed synchronous signal;

receive signal converting means for converting said compressed synchronous signal into a compressed asynchronous signal; and

receive signal processing means for decompressing said compressed asynchronous signal into a digital signal and outputting said digital signal.

17. The portable integrated receiving system as claimed in claim 16, wherein said receive signal processing means comprises video editing means for editing said digital signal.

18. The portable integrated receiving system as claimed in claim 16, wherein said receive signal processing means comprises memory means for storing said compressed asynchronous signal.

19. The portable integrated receiving system as claimed in claim 16, further comprising a satellite modem demodulating means coupled to said microwave receiving means and said receive signal converting means for correcting errors in said modulated microwave signal.

20. The portable integrated receiving system as claimed in claim 16, wherein said microwave receiving means comprises microwave antenna means for receiving said modulated microwave signal.

21. The portable integrated receiving system as claimed in claim 20, wherein said microwave antenna means comprises an L-band microwave antenna.

22. The portable integrated receiving system as claimed in claim 20, wherein said microwave antenna means comprises a satellite dish.

23. The portable integrated receiving system as claimed in claim 22, wherein said satellite dish is a collapsible satellite dish.

24. The portable integrated receiving system as claimed in claim 16, wherein said receive signal converting means comprises a synchronous to asynchronous interface converter.

25. The portable integrated receiving system, as claimed in claim 16, wherein said receive signal converting means comprises a V.35 to RS-232 interface converter.

26. The portable integrated receiving system as claimed in claim 16, further comprising a scan converter coupled to said receive signal processing means for converting said digital signal into a display signal.

27. The portable integrated receiving system as claimed in claim 26, further comprising monitor means coupled to said scan converter for receiving and displaying said display signal.

28. The portable integrated receiving system as claimed in claim 26, further comprising recording means coupled to said scan converter for receiving and recording said display signal.

29. The portable integrated receiving system as claimed in claim 16, further comprising housing means for housing said microwave receiving means, said receive signal converting means and said receive signal processing means.

30. The portable integrated receiving system as claimed in claim 29, further comprising a handle attached to said housing means for carrying said housing means.

31. The portable integrated receiving system as claimed in claim 29, wherein said housing means is a suitcase.

32. A transmission and receiving system, comprising:

transmit interface means for transforming an analog signal into a digital signal;

transmit signal processing means coupled to said transmit interface means for compressing said digital signal into a compressed asynchronous signal;

transmit signal converting means coupled to said transmit signal processing means for converting said compressed asynchronous signal into a compressed synchronous signal;

microwave transmitting means coupled to said transmit signal converting means for generating a microwave signal and demodulating said microwave signal with said compressed synchronous signal to produce a first modulated microwave signal and for transmitting said first modulated microwave signal;

microwave receiving means for receiving a second modulated microwave signal which has been modulated with said compressed synchronous signal and for demodulating said second modulated microwave signal yielding said compressed synchronous signal;

receive signal converting means coupled to said microwave receiving means for converting said compressed synchronous signal into said compressed asynchronous signal; and

second signal processing means coupled to said receive signal converting means for decompressing said compressed asynchronous signal into said digital signal and outputting said digital signal.

33. The transmission and receiving system as claimed in claim 32, further comprising a satellite transmit modem demodulating means coupled to said microwave transmitting means and said transmit signal converting means for correcting errors in said modulated microwave signal.

34. The transmission and receiving system as claimed in claim 32, wherein said transmit signal processing means comprises video editing means for editing said digital signal.

35. The transmission and receiving system as claimed in claim 32, wherein said microwave transmitting means comprises microwave generating means for generating said microwave signal and microwave antenna means for transmitting said modulated microwave signal.

36. The transmission and receiving system as claimed in claim 35, wherein said microwave generating means comprises an L-band microwave generator.

37. The transmission and receiving system as claimed in claim 35, wherein said microwave antenna means comprises a satellite dish.

38. The transmission and receiving system as claimed in claim 37, wherein said satellite dish comprises a collapsible satellite dish.

39. The transmission and receiving system as claimed in claim 32, further comprising a satellite modem demodulating means coupled to said microwave receiving means and said receive signal converting means for correcting errors in said modulated microwave signal.

40. The transmission and receiving system as claimed in claim 32, further comprising a signal patch means coupled to said microwave transmitting means and said microwave receiving means for completing a channel between said microwave transmitting means to said microwave receiving means.

41. The transmission and receiving system as claimed in claim 32, further comprising housing means for housing said transmit interface means, said transmit signal processing means, said transmit signal converting means and said microwave transmitting means.

42. A portable integrated digital high speed data line receiving system, comprising:

receive signal converting means for receiving a compressed synchronous signal from a high speed data line, translating voltage levels of said compressed synchronous signal and converting said compressed synchronous signal into a compressed asynchronous signal;

receive signal processing means coupled to said receive signal converting means for decompressing said compressed asynchronous signal into a digital signal and outputting said digital signal.

43. The portable integrated digital high speed data line receiving system as claimed in claim 42, further comprising housing means for housing said receive signal converting means and said receive signal processing means.

44. The portable integrated digital high speed data line receiving system as claimed in claim 43, further comprising a handle attached to said housing means for carrying said housing.

45. The portable integrated digital high speed data line receiving system as claimed in claim 43, wherein said housing means is a suitcase.

46. A transmission and digital receiving system, comprising:

transmit interface means for transforming an analog signal into a digital signal;

transmit signal processing means coupled to said transmit interface means for compressing said digital signal into a compressed asynchronous signal;

transmit signal converting means coupled to said transmit signal processing means for converting said compressed asynchronous signal into a compressed synchronous signal;

microwave transmitting means coupled to said transmit signal converting means for generating a microwave signal and modulating said microwave signal with said compressed synchronous signal to provide a modulated microwave signal and for transmitting said modulated microwave signal to a digital high speed data link;

receive signal converting means for receiving said compressed synchronous signal from a high speed data line in the digital high speed data link, for translating voltage levels of said compressed synchronous signal and for converting said compressed synchronous signal to yield said compressed asynchronous signal; and

receive signal processing means coupled to said receive signal converting means for decompressing said compressed asynchronous signal into said digital signal and outputting said digital signal.

47. A portable integrated teleconference station comprising:

demodulating means for receiving and demodulating an analog signal and outputting a first digital signal;

encoding and compressing means coupled to said demodulating means for receiving said first digital signal and for encoding and compressing said first digital signal to yield a first compressed encoded signal;

microwave transmitting and receiving means coupled to said encoding and compressing means for receiving said first compressed encoded signal, for generating a first microwave signal, for modulating said first microwave signal according to said first compressed encoded signal to produce a first modulated microwave signal and for outputting said first modulated microwave signal, as well as for receiving a second modulated microwave signal which has been modulated with a second compressed encoded signal and for demodulating said second modulated microwave signal to yield said second compressed encoded signal; and

decoding and decompressing means coupled to said microwave transmitting and receiving means for decoding and decompressing said second compressed encoded signal into a second digital signal and for outputting said second digital signal.

48. The portable integrated teleconference station as claimed in claim 47, further comprising housing means for housing said demodulating means, said encoding and compressing means, said microwave transmitting and receiving means and said decoding and decompressing means.

49. The portable integrated teleconference station as claimed in claim 48, further comprising a handle attached to said housing means for carrying said housing means.

50. The portable integrated teleconference station as claimed in claim 48, wherein said housing means is a suitcase.

51. A teleconference system, comprising:

first demodulating means for receiving and demodulating a first analog signal and outputting a first digital signal;

first encoding and compressing means coupled to said first demodulating means for receiving said first digital signal and for encoding and compressing said first digital signal into a first compressed encoded signal;

first microwave transmitting and receiving means coupled to said first encoding and compressing means for receiving said first compressed encoded signal, for generating a first microwave signal, for modulating said first microwave signal according to said first compressed encoded signal to produce a first modulated microwave signal and for transmitting said first modulated microwave signal, as well as for receiving a second modulated microwave signal which has been modulated with a second compressed encoded signal and for demodulating said second modulated microwave signal to yield said second compressed encoded signal;

first decoding and decompressing means coupled to said first microwave transmitting and receiving means for decoding and decompressing said second compressed encoded signal into a second digital signal and for outputting said second digital signal;

second demodulating means for receiving and demodulating a second analog signal into said second digital signal;

second encoding and compressing means coupled to said second demodulating means for receiving said second digital signal and for encoding and compressing said second digital signal into said second compressed encoded signal;

second microwave transmitting and receiving means coupled to said second encoding and compressing means for receiving said second compressed encoded signal, for generating

a second microwave signal, for modulating said second microwave signal according to said second compressed encoded signal to produce a third modulated microwave signal and for transmitting said third modulated microwave signal, as well as for receiving a fourth modulated microwave signal which has been modulated with said first compressed encoded signal for demodulating said fourth modulated microwave signal to yield said first compressed encoded signal; and

second decoding and decompressing means coupled to said second microwave transmitting and receiving means for decoding and decompressing said first compressed encoded signal into said first digital signal and for outputting said first digital signal.

52. A high speed digital teleconference station, comprising:

demodulating means for receiving a first analog signal and outputting a first digital signal;

encoding/compression means coupled to said demodulating means for receiving, compressing and encoding said first digital signal into a first compressed encoded signal and outputting said first compressed encoded signal to a high speed data line; and

decoding/decompression means for receiving a second compressed encoded signal from the high speed data line and for decoding and decompressing said second compressed encoded signal into a second digital signal and outputting said second digital signal.

53. The high speed digital teleconference station as claimed in claim 52, further comprising housing means for housing said demodulating means, said encoding/compressing means and said decoding/decompression means.

54. The high speed digital teleconference station as claimed in claim 53, further comprising a handle attached to said housing means for carrying said housing means.

55. The high speed digital teleconference station as claimed in claim 53, wherein said housing means is a suitcase.

56. A teleconference system, comprising:

first demodulating means for receiving and demodulating a first analog signal and outputting a first digital signal;

first encoding and compressing means coupled to said first demodulating means for receiving said first digital signal and for encoding and compressing said first digital signal into a first compressed encoded signal;

first microwave transmitting and receiving means coupled to said first encoding and compressing means for receiving said first compressed encoded signal, for generating a first microwave signal, for modulating said first microwave signal according to said first compressed encoded signal to produce a first modulated microwave signal and for transmitting said first modulated microwave signal, as well as for receiving a second modulated microwave signal which has been modulated with a second compressed encoded signal and for demodulating said second modulated microwave signal to yield said second compressed encoded signal;

first decoding and decompressing means coupled to said first microwave transmitting means for decoding and decompressing said second compressed encoded signal into a second digital signal and for outputting said second digital signal;

second demodulating means for receiving a second analog signal and outputting said second digital signal;

second encoding/compression means coupled to said second demodulating means for receiving, compressing and encoding said second digital signal into said second compressed encoded

signal and outputting said second compressed encoded signal to a high speed data line; and

second decoding/decompressing means for receiving said first compressed encoded signal from the high speed data line and for decoding and decompressing said first compressed encoded signal into said first digital signal and for outputting said first digital signal.

57. A high speed teleconference station, comprising:

interface means for receiving a first analog signal and outputting a first digital signal;

encoding/compressing means for encoding and compressing said first digital signal to yield a first compressed encoded signal;

multiplexing and demultiplexing means for receiving and splitting said first compressed encoded signal into two first compressed encoded signals and for receiving two second encoded compressed signals and outputting a combined second encoded compressed signal;

dual converting means coupled to said multiplexing and demultiplexing means for receiving said two first compressed encoded signals and outputting two first synchronous signals and for receiving two second synchronous signals and outputting said two second encoded compressed signals;

two microwave transmitter/receiver means for receiving said two first synchronous signals, for generating two first microwave signals, for modulating said two first microwave signals according to said two first synchronous signals to produce two first modulated microwave signals and for outputting said two first modulated microwave signals, as well as for receiving two second modulated microwave signals which have been modulated with said two second synchronous signals and for outputting said two second synchronous signals;

combining/splitting means for combining said two first modulated microwave signals into a combined first modulated

microwave signal and for splitting a combined second modulated microwave signal into said two second modulated microwave signals; and

decoding/decompressing means coupled to said multiplexing and demultiplexing means for decoding and decompressing said combined second encoded compressed signal and outputting a second digital signal.

58. A high speed teleconference station, comprising:

interface means for receiving a first analog signal and outputting a first digital signal;

encoding/compressing means for encoding and compressing said first digital signal to yield a first compressed encoded signal;

multiplexing and demultiplexing means for receiving and splitting said first compressed encoded signal into two first compressed encoded signals and for receiving two second encoded compressed signals and outputting a combined second encoded compressed signal;

dual converting means coupled to said multiplexing and demultiplexing means for receiving said two first compressed encoded signals and outputting two first synchronous signals and for receiving two second synchronous signals and outputting said two second encoded compressed signals;

two CCIT units for receiving said two first synchronous signals and for outputting said two first synchronous signals to a high speed data link as well as for receiving two second synchronous signals from the high speed data link; and

decoding/decompressing means coupled to said dual converting means for decoding and decompressing said combined second encoded compressed signal and outputting a second digital signal.

59. A method of transmitting information, comprising the steps of:

compressing a digital signal containing said information into a compressed asynchronous signal using a signal processor;

converting said compressed asynchronous signal into a compressed synchronous signal using a signal converter;

generating a microwave signal using a microwave transmitter;

modulating said microwave signal with said compressed synchronous signal to produce a modulated microwave signal using the microwave transmitter; and

transmitting said modulated microwave signal using the microwave transmitter.

60. A method of receiving information, comprising the steps of:

receiving a modulated microwave signal which has been modulated with a compressed synchronous signal using a microwave receiver;

demodulating said modulated microwave signal into said compressed synchronous signal;

converting said compressed synchronous signal into a compressed asynchronous signal;

decompressing said compressed asynchronous signal into a digital signal containing said information using a processor; and

outputting said digital signal.

61. A method of transmitting and receiving information, comprising the steps of:

compressing a digital signal containing said information into a compressed asynchronous signal using a transmit processor;

converting said compressed asynchronous signal into a compressed synchronous signal using a transmit signal converter;

generating a microwave signal and modulating said microwave signal with said compressed synchronous signal to produce a first modulated microwave signal using a microwave transmitter;

transmitting said first modulated microwave signal with the microwave transmitter;

receiving a second modulated microwave signal which has been modulated with said compressed synchronous signal at a microwave receiver;

demodulating said second modulated microwave signal yielding said compressed synchronous signal;

converting said compressed synchronous signal into said compressed asynchronous signal using a receive signal converter;

decompressing said compressed asynchronous signal into said digital signal using a receive signal processor; and

outputting said digital signal containing said information.

62. An information distribution system for a digital network, comprising:

master communication means coupled to the digital network for establishing communications with the network in order to receive a synchronous digital signal;

distribution amplifier means coupled to said master communications means for receiving and dividing said synchronous digital signal into a plurality of synchronous signals;

plurality of communications means coupled to said distribution amplifier means for establishing communications with a plurality of receiving stations and for receiving and outputting said plurality of synchronous signals to the plurality of receiving stations; and

master controller means coupled to said plurality of communications means for controlling said plurality of communications means from a central location.

63. The information distribution system, as claimed in claim 62, wherein said distribution amplifier means further includes converting means for converting at least one of said plurality of synchronous signals into at least one asynchronous signal.

64. The information distribution system as claimed in claim 62, wherein said master controller means further includes input means for inputting instructions to control said plurality of communications means.

65. The information distribution system as claimed in claim 63, further comprising a first back-up memory for receiving and storing said at least one asynchronous signal.

66. The information distribution system as claimed in claim 63, further comprising a recorder for receiving and storing said at least one asynchronous signal.

67. The information distribution system as claimed in claim 62, wherein said master controller means comprises display means for displaying information associated with said plurality of communications means.

68. The information distribution system as claimed in claim 64, wherein said input means comprises a keyboard.

69. The information distribution system as claimed in claim 62, wherein said distribution amplifier means comprises equalizing means for equalizing respective amplitudes of said plurality of synchronous signals.

70. An information disseminating system for a digital network, comprising:

a plurality of video clip storing means for storing data, each of said plurality of video clip storing means storing data related to a particular subject matter;

a plurality of distribution amplifier means each having an input for receiving data from a respective one of said plurality of video clip storing means and each having at least one output, for dividing said data stored in each of said plurality of video clip storing means;

a plurality of communications means each being coupled to one of said plurality of distribution amplifier means for establishing communications between said plurality of distribution amplifiers and the digital network; and

menu storing means accessible from the digital network, for storing information indicating the subject matter associated with each of said plurality of video clip storing means as well as information as to how to access each of said video clip storing means.

71. A method for distributing information to various locations in a digital network, comprising the steps of:

establishing communications with the network in order to receive a synchronous digital signal from the network;

receiving and dividing the synchronous digital signal into a plurality of synchronous signals;

establishing communications with a plurality of receiving stations;

receiving and outputting a respective one of the plurality of synchronous signals to a respective receiving station; and

controlling said receiving and outputting step with a controller unit at a central location.

72. The method for distributing information as claimed in claim 71, further including the step of converting at least one

of said plurality of synchronous signals into at least one asynchronous signal.

73. The method for distributing information as claimed in claim 71, further comprising the step of converting at least one of said plurality of synchronous signals into at least one asynchronous signal.

74. The method for distributing information as claimed in claim 73, further comprising the step of storing the at least one asynchronous signal in a memory.

75. The method for distributing information as claimed in claim 73, further comprising the step of recording the at least one asynchronous signal with a back-up recorder.

76. The method for distributing information as claimed in claim 73, further comprising the step of equalizing respective amplitudes of the plurality of synchronous signals.

77. A mobile microwave system, comprising:

a power generator;

a microwave subsystem coupled to said power generator for transmitting first local microwave signals modulated with first local digital data while in motion with respect to earth and for receiving first remote microwave signals modulated with first remote digital data while in motion with respect to earth;

a high speed digital station coupled to said power generator and said microwave subsystem, for receiving a video signal and for transforming and compressing said video signal into said first local digital data and for transforming and decompressing said first remote digital data into a first decompressed remote digital data; and

a vehicle for housing said power generator, said microwave subsystem and said high speed digital station, said vehicle

having a lower portion and an upper portion, wherein said first local microwave signals can pass through said upper portion.

78. An L band microwave system, comprising:

an L band microwave subsystem for transmitting first local microwave signals modulated with first local digital data and for receiving first remote microwave signals modulated with first remote digital data; and

a high speed digital station coupled to said L band microwave subsystem, for receiving a video signal and for transforming, editing and compressing said video signal into said first local digital data and for decompressing, editing and transforming said first remote digital data into first decompressed remote digital data.

79. The mobile microwave system as claimed in claim 77, wherein said high speed digital station, comprises:

signal converter for receiving and converting said first remote digital data and outputting a first asynchronous compressed remote digital data, and for receiving and converting first asynchronous compressed local digital data to yield said first local digital data; and

receive signal processor for receiving, editing and decompressing said first asynchronous compressed remote digital data to yield first decompressed remote digital data and for compressing and editing first decompressed local digital data to yield said first asynchronous compressed local digital data.

80. The L band microwave system as claimed in claim 78, wherein said high speed digital station, comprises:

signal converter for receiving and converting said first remote digital data and outputting a first asynchronous compressed remote digital data, and for receiving and converting first asynchronous compressed local digital data to yield said first local digital data; and

receive signal processor for receiving, editing and decompressing said first asynchronous compressed remote digital data to yield first decompressed remote digital data and for compressing and editing first decompressed local digital data to yield said first asynchronous compressed local digital data.

81. The mobile microwave system as claimed in claim 77, wherein said microwave subsystem is one of a standard M microwave subsystem and a standard B microwave subsystem.

82. The mobile microwave system as claimed in claim 81, further comprising a standard A microwave subsystem coupled to said power generator and said high speed digital station.

83. The mobile microwave system as claimed in claim 77, wherein said microwave subsystem is a standard A microwave subsystem.

84. The mobile microwave system as claimed in claim 83, further comprising one of a standard M and a standard B microwave subsystem coupled to said power generator and said high speed digital station.

85. The mobile microwave system as claimed in claim 77, further comprising a display unit coupled to said high speed digital station and said power generator, for displaying said first decompressed remote digital data.

86. The mobile microwave system as claimed in claim 77, wherein said microwave subsystem comprises:

an antenna assembly for transmitting said first local microwave signals and for receiving said first remote microwave signals; and

an antenna terminal coupled to said antenna assembly and said high speed digital station for demodulating said first microwave signals.

87. The L band microwave system as claimed in claim 78, wherein said L band microwave subsystem is one of a standard M and a standard B microwave subsystem.

88. The L band microwave system as claimed in claim 87, further comprising a standard A microwave subsystem coupled to said high speed microwave station.

89. The L band microwave system as claimed in claim 78, wherein said L band microwave subsystem is a standard A microwave subsystem.

90. The L band microwave system as claimed in claim 89, further comprising a standard M microwave subsystem coupled to said high speed digital station.

91. The L band microwave system as claimed in claim 78, further comprising a display unit coupled to said high speed digital station and said power generator, for displaying said first decompressed remote digital data.

92. The L band microwave system as claimed in claim 78, further comprising:

a power generator connected to said L band subsystem and said high speed digital station; and

a vehicle having a lower portion and an upper portion for housing said L band microwave subsystem and said high speed digital station, wherein said upper portion passes microwaves with energies in the L band.

93. An L band microwave system, comprising:

a power generator;

a standard A subsystem coupled to said power generator, including:

an antenna assembly for transmitting A band local microwave signals and for receiving A band remote microwave signals; and

a standard A antenna terminal coupled to said standard A antenna assembly for receiving, demodulating and processing said A band remote microwave signals to yield first remote digital signals, and for processing first local digital signals to generate said A band local microwave signals and for controlling said antenna assembly in accordance with GPS data;

a standard M subsystem coupled to said power generator, including:

an array antenna for transmitting M band local microwave signals and for receiving M band remote microwave signals; and

a standard M array antenna terminal coupled to said array antenna for receiving, demodulating and processing said M band remote microwave signals to yield second remote digital signals, for processing second local digital signals to generate said M band local microwave signals and for controlling said array antenna in accordance with said GPS data;

a high speed digital station coupled to said A band subsystem, said standard M subsystem and said power generator, including:

signal converter for receiving and converting said first and second remote digital data and outputting first and second asynchronous compressed remote digital data, respectively, and for receiving and converting first and second asynchronous compressed local digital data to yield said first and second local digital data, respectively;

receive signal processor for receiving, editing and decompressing said first and second asynchronous compressed remote digital data to yield first and second decompressed remote digital data and for compressing and editing first and second decompressed local digital data to yield said first and second asynchronous compressed local digital data; and

video signal receiver and display coupled to said receive signal processor for receiving and displaying at least one of said first and second decompressed remote digital data, and for receiving a video signal and transforming said video signal into said first and second decompressed local digital data and for displaying said video signal;

microwave suitcase subsystem, including:

microwave transmitter for receiving an external video signal and transmitting a microwave signal modulated with said external video signal; and

microwave receiver for receiving and demodulating said microwave signal to yield said video signal;

GPS subsystem coupled to said power generator, comprising:

GPS antenna; and

GPS receiver coupled to said GPS antenna and said high speed digital station, for determining location information of said vehicle and outputting said location information to said high speed digital station, as said GPS data;

a vehicle for housing said power generator, said standard A subsystem, said standard M subsystem, said high speed digital station and said microwave receiver, said vehicle including a lower portion and an upper portion, wherein said upper portion passes L band microwaves; and

video camera coupled to said video camera signal receiver via said microwave suitcase subsystem, for outputting said external video signal.

94. An L band microwave system, comprising:

a power generator;

a standard A subsystem coupled to said power generator for transmitting first local microwave signals modulated with first local digital data and for receiving and demodulating first remote microwave signals to yield first remote digital data;

a standard M subsystem coupled to said power generator for transmitting second local microwave signals modulated with second local digital data and for receiving and demodulating second remote microwave signals to yield second remote digital data;

a high speed digital station coupled to said standard A subsystem, said standard M subsystem and said power generator, including:

signal converter for receiving and converting said first and second remote digital data and outputting first and second asynchronous compressed remote digital data, respectively, and for receiving and converting first and second asynchronous compressed local digital data to yield said first and second local digital data, respectively;

receive signal processor for receiving, editing and decompressing said first and second asynchronous compressed remote digital data to yield first and second decompressed remote digital data and for compressing and editing first and second decompressed local digital data to yield said first and second asynchronous compressed local digital data; and

video signal receiver and display coupled to said receive signal processor for receiving and displaying at least one of said first and second decompressed remote digital data and for receiving a video signal and for transforming said video signal into said first and second decompressed local digital data and for displaying said video signal;

microwave subsystem, including:

microwave transmitter for receiving an external video signal and transmitting a microwave signal modulated with said external video signal; and

microwave receiver for receiving and demodulating said microwave signal to yield said video signal;

a vehicle for housing said power generator, said standard A subsystem, said standard M subsystem, said high speed digital station and said microwave receiver, said vehicle including a lower portion and an upper portion, wherein microwaves with energies in the L band can pass through said upper portion; and

video camera coupled to said video camera signal receiver via said microwave subsystem for outputting said external video signal.

95. The mobile microwave system as claimed in claim 77, further comprising:

GPS antenna; and

GPS receiver coupled to said GPS antenna and said high speed digital station, for determining location information of said vehicle and outputting said location information to said high speed digital station, as GPS data.

96. The mobile microwave system as claimed in claim 95, further comprising:

a standard C antenna;

a standard C transmitter and receiver, coupled to at least one of said GPS receiver and said high speed digital station for receiving said location information and transmitting said location information to a satellite.

97. The L band microwave system as claimed in claim 78, further comprising:

GPS antenna; and

GPS receiver coupled to said GPS antenna and said high speed digital station, for determining location information of said

vehicle and outputting said location information to said high speed digital station, as GPS data.

98. The L band microwave system as claimed in claim 97, further comprising:

a standard C antenna;

a standard C transmitter and receiver, coupled to at least one of said GPS receiver and said high speed digital station for receiving said location information and transmitting said location information to a satellite.

99. A housing for a portable integrated communications system, comprising:

a suitcase for housing said portable integrated communications system having a lid and a bottom portion, said bottom portion having a bottom and sides, said sides having a holding ledge attached thereto;

a plate having a top and a bottom and being capable of fitting within said bottom portion with a spacing between said sides of said suitcase and said plate, said plate being supported in said bottom portion of said suitcase by said holding ledge; and

attachment means for attaching said portable integrated communications system to said plate such that said portable integrated communications system does not contact said suitcase.

100. A portable integrated transmission system, comprising:

transmit interface means for transforming an analog signal into a digital signal;

transmit signal processing means for compressing said digital signal into a compressed asynchronous signal;

transmit signal converting means for converting said compressed asynchronous signal into a compressed synchronous signal;

microwave transmitting means for generating a microwave signal and modulating said microwave signal with said compressed synchronous signal to produce a modulated microwave signal and for transmitting said modulated microwave signal; and

a housing for housing said transmit interface means, said transmit signal processing means, said transmit signal converting means and said microwave transmitting means, including:

a suitcase having a lid and a bottom portion, said bottom portion having a bottom and sides, said sides having a holding ledge attached thereto; and

a plate having a top and a bottom and being capable of fitting within said bottom portion with a spacing between said sides of said suitcase and said plate, said plate being supported in said bottom portion of said suitcase by said holding ledge,

attachment means for attaching said transmit interface means, said transmit signal processing means, said transmit signal converting means and said microwave transmitting means to said plate, wherein said transmit interface means, said transmit signal processing means, said transmit signal converting means and said microwave transmitting means do not contact said suitcase.

101. A portable integrated receiving system, comprising:

microwave receiving means for receiving a modulated microwave signal which has been modulated with a compressed synchronous signal and for demodulation said modulated microwave signal into said compressed synchronous;

receive signal converting means for converting said compressed synchronous signal into a compressed asynchronous signal;

receive signal processing means for decompressing said compressed asynchronous signal into a digital signal and outputting said digital signal;

a housing for housing said microwave receiving means, said receive signal converting means, and said receive signal processing means, including:

a suitcase having a lid and a bottom portion, said bottom portion having a bottom and sides, said sides having a holding ledge attached thereto; and

a plate having a top and a bottom and being capable of fitting within said bottom portion with a spacing between said sides of said suitcase and said plate, said plate being supported in said bottom portion of said suitcase by said holding ledge,

attachment means for attaching said microwave receiving means, said receive signal converting means and said receive signal processing means to said plate, wherein said microwave receiving means, said receive signal converting means and said receive signal processing means do not contact said suitcase.

102. A transmission and receiving system, comprising:

transmit interface means for transforming an analog signal into a digital signal;

transmit signal processing means coupled to said transmit interface means for compressing said digital signal into a compressed asynchronous signal;

transmit signal converting means coupled to said transmit signal processing means for converting said compressed asynchronous signal into a compressed synchronous signal;

microwave transmitting means coupled to said transmit signal converting means for generating a microwave signal and demodulating said microwave signal with said compressed synchronous signal to produce a first modulated microwave signal and for transmitting said first modulated microwave signal;

microwave receiving means for receiving a second modulated microwave signal which has been modulated with said compressed

synchronous signal and for demodulating said second modulated microwave signal yielding said compressed synchronous signal;

receive signal converting means coupled to said microwave receiving means for converting said compressed synchronous signal into said compressed asynchronous signal; and

second signal processing means coupled to said receive signal converting means for decompressing said compressed asynchronous signal into said digital signal and outputting said digital signal; and

a housing for housing said transmit interface means, said transmit signal processing means, said microwave transmitting means, said microwave receiving means, said receive signal converting means and said second signal processing means, said housing including:

a suitcase having a lid and a bottom portion, said bottom portion having a bottom and sides, said sides having a holding ledge attached thereto;

a plate having a top and a bottom and being capable of fitting within said bottom portion with a spacing between said sides of said suitcase and said plate being supported in said bottom portion of said suitcase by said holding ledge; and

attachment means for attaching said transmit interface means, said transmit signal processing means, said microwave transmitting means, said microwave receiving means, said receive signal converting means and said second signal processing means to said plate such that said transmit interface means, said transmit signal processing means, said microwave transmitting means, said microwave receiving means, said receive signal converting means and said second signal processing means do not contact said suitcase.

103. The housing as claimed in claim 99, wherein said plate is shaped to provide at least 3/4 of an inch between said sides of said suitcase and said edges of said plate.

104. The housing as claimed in claim 99, wherein said holding ledge is comprised of metal.

105. The housing as claimed in claim 99, wherein said plate is flexible.

106. The housing as claimed in claim 99, wherein said housing is comprised of plastic.

107. The housing as claimed in claim 99, wherein said plate has a plurality of holes for securing said system thereto.

108. The housing as claimed in claim 99, wherein said attachment means comprises a basket frame attached to said plate.

109. The portable integrated transmission system as claimed in claim 100, wherein said attachment means comprises a basket frame attached to said plate.

110. The portable integrated receiving system as claimed in claim 101, wherein said attachment means comprises a basket frame attached to said plate.

111. The transmission and receiving system as claimed in claim 102, wherein said attachment means comprises a basket frame attached to said plate.

112. The housing as claimed in claim 108, wherein said attachment means further comprises panels fitted in said basket frame.

113. The portable integrated transmission system as claimed in claim 109, wherein said attachment means further comprises panels fitted in said basket frame.

114. The portable integrated receiving system as claimed in claim 110, wherein said attachment means further comprises panels fitted in said basket frame.

115. The transmission and receiving system as claimed in claim 111, wherein said attachment means further comprises panels fitted in said basket frame.

116. The housing as claimed in claim 99, further comprising a rubber strip sandwiched between said holding ledge and said plate.

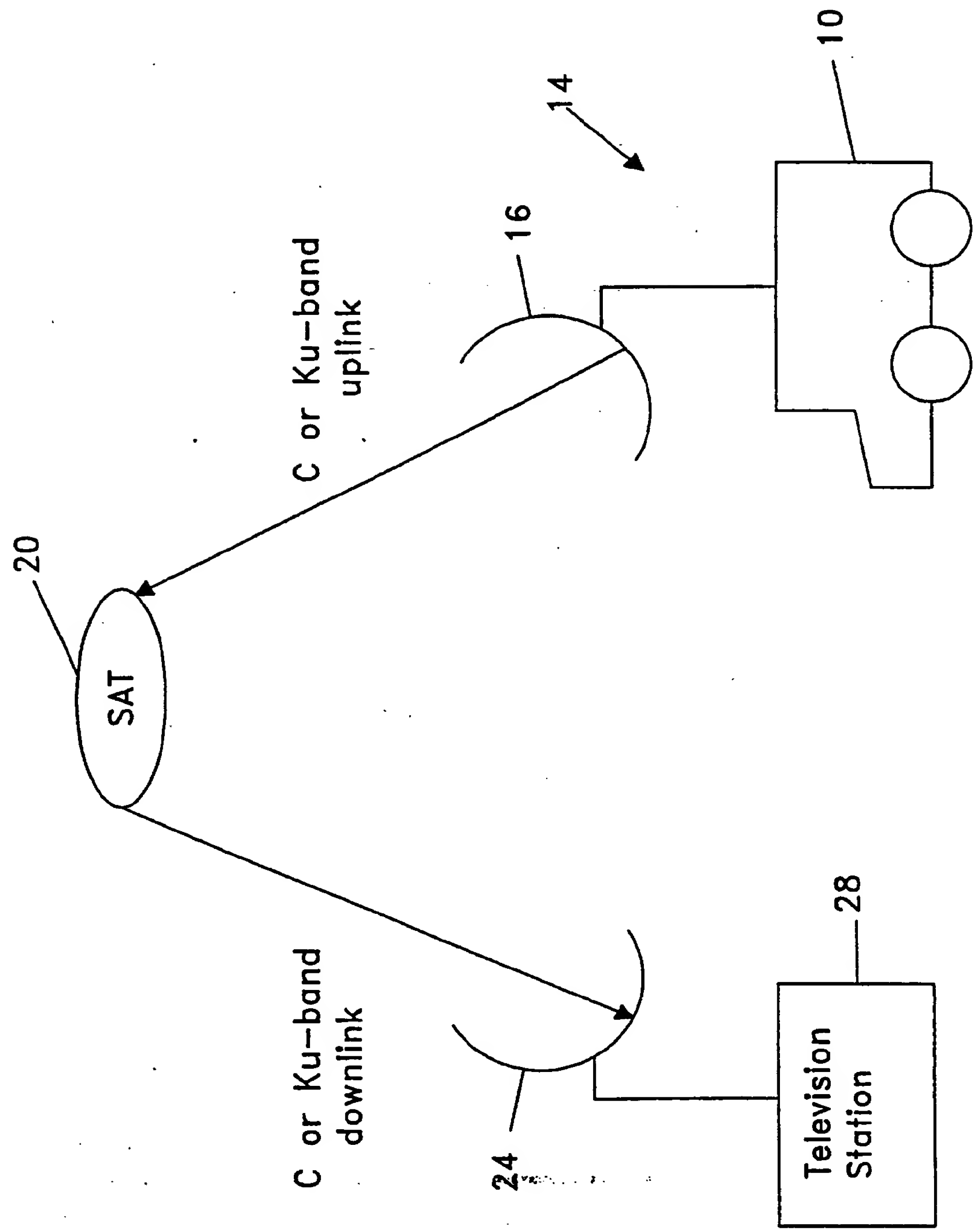
117. The housing as claimed in claim 116, wherein said attachment means comprises a basket frame attached to said plate.

118. The housing as claimed in claim 117, wherein cushions are inserted between said basket frame and said plate.

119. The housing as claimed in claim 118, wherein perforated aluminum panels are fitted in said basket frame.

120. The housing as claimed in claim 119, wherein components of said communications system are attached to said perforated aluminum panels.

121. The housing as claimed in claim 119, wherein one of said perforated aluminum panels is a bottom panel and particularly sensitive components of said communications system are isolated from said bottom panel with rubber cylinders.



10
14
16
C or Ku-band uplink
20
SAT
C or Ku-band downlink
28
Television Station
24

FIGURE 1A

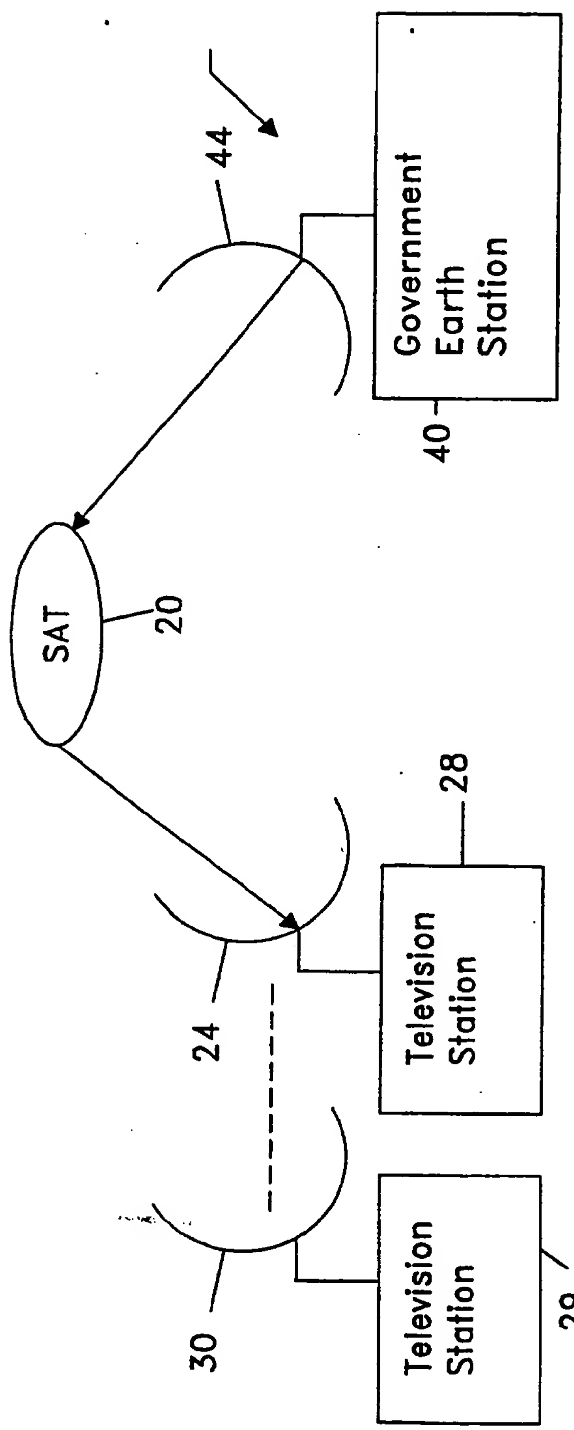


FIGURE 1B

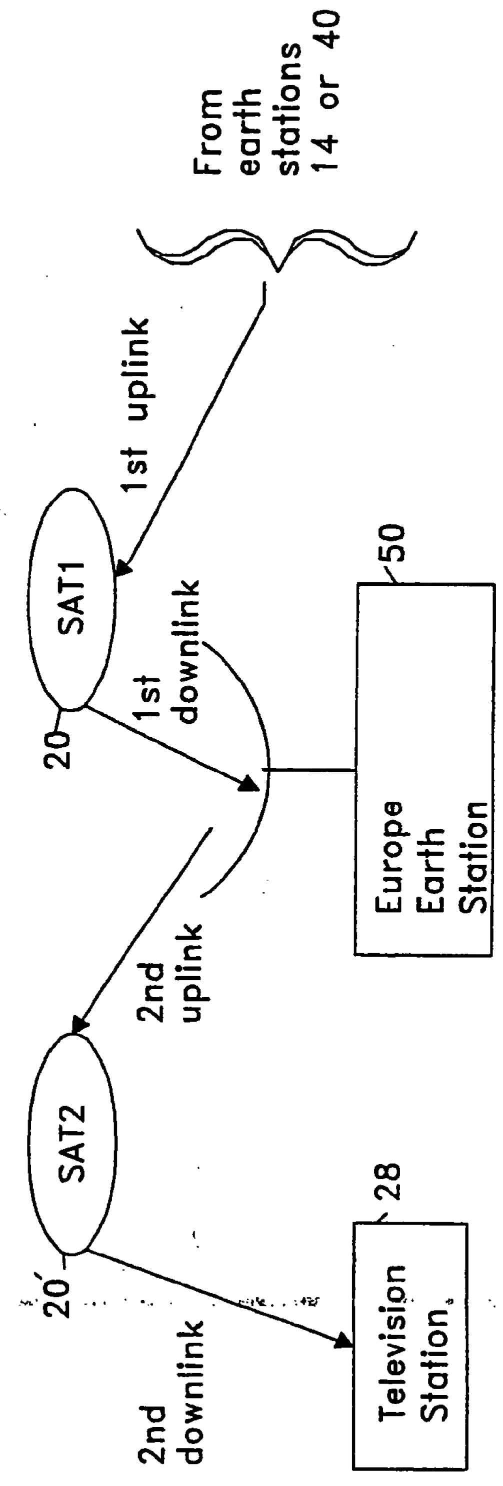


FIGURE 1C

SUBSTITUTE SHEET

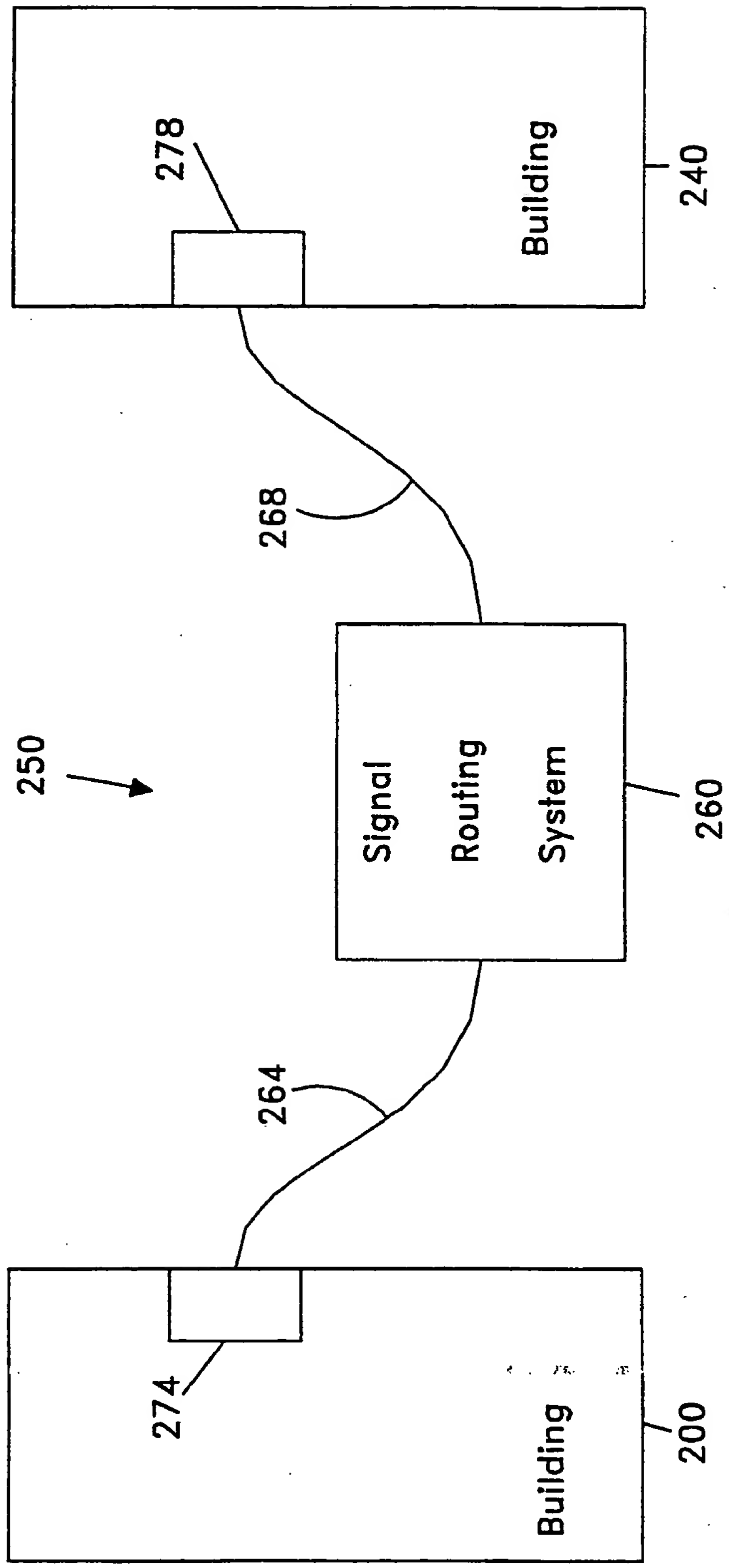

278
Building
240
268
250
Signal
Routing
System
260
264
274
Building
200

FIGURE 2

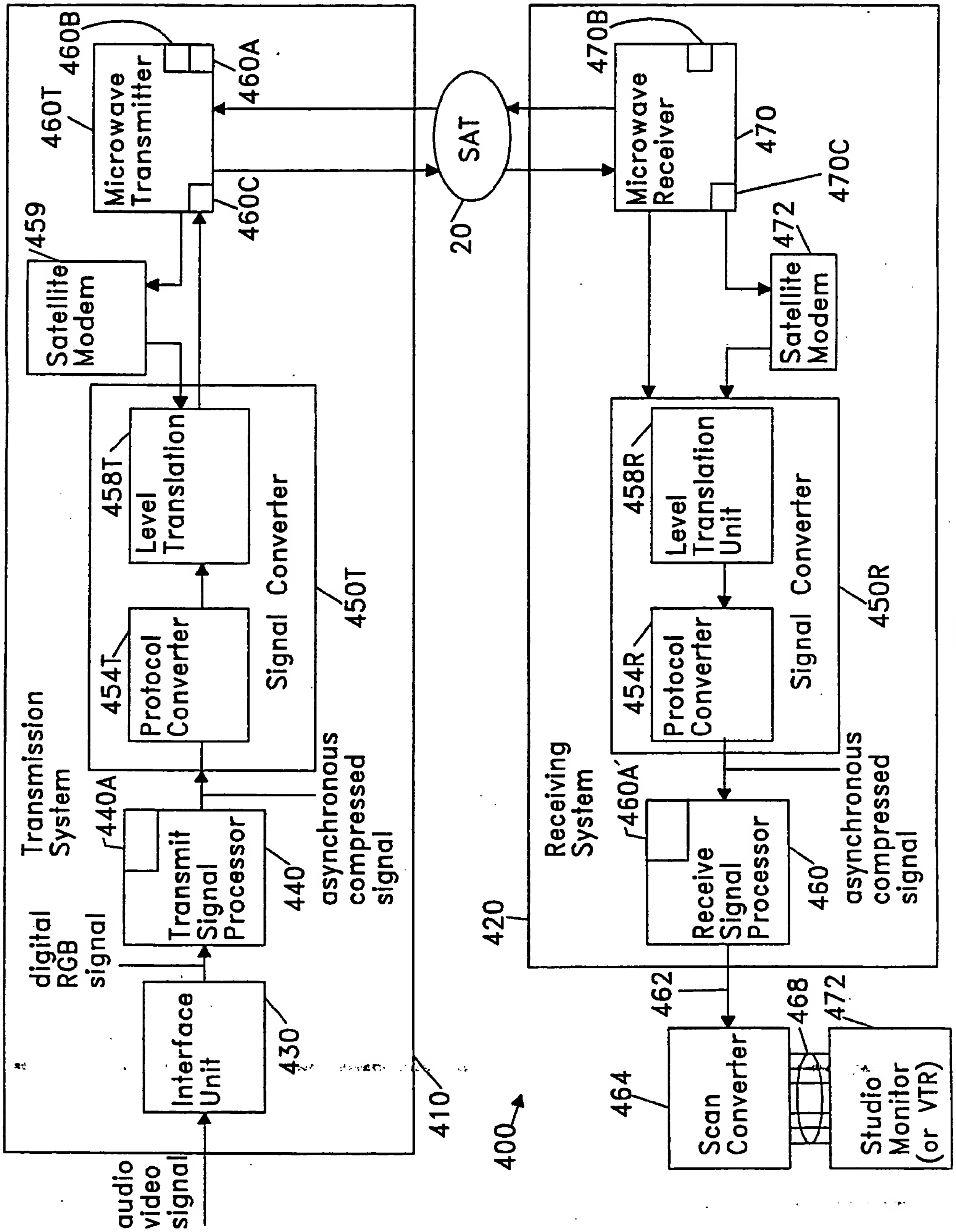

Transmission System
audio video signal
Interface Unit
430
digital RGB signal
Transmit Signal Processor
440A
440
asynchronous compressed signal
Protocol Converter
454T
Level Translation
458T
Signal Converter
450T
Satellite Modem
459
Microwave Transmitter
460T
460B
460A
460C
410
400
SAT
20
Receiving System
420
Microwave Receiver
470B
470
470C
Satellite Modem
472
Level Translation Unit
458R
Protocol Converter
454R
Signal Converter
450R
460A'
Receive Signal Processor
460
asynchronous compressed signal
462
Scan Converter
464
468
472
Studio Monitor (or VTR)

FIGURE 3A

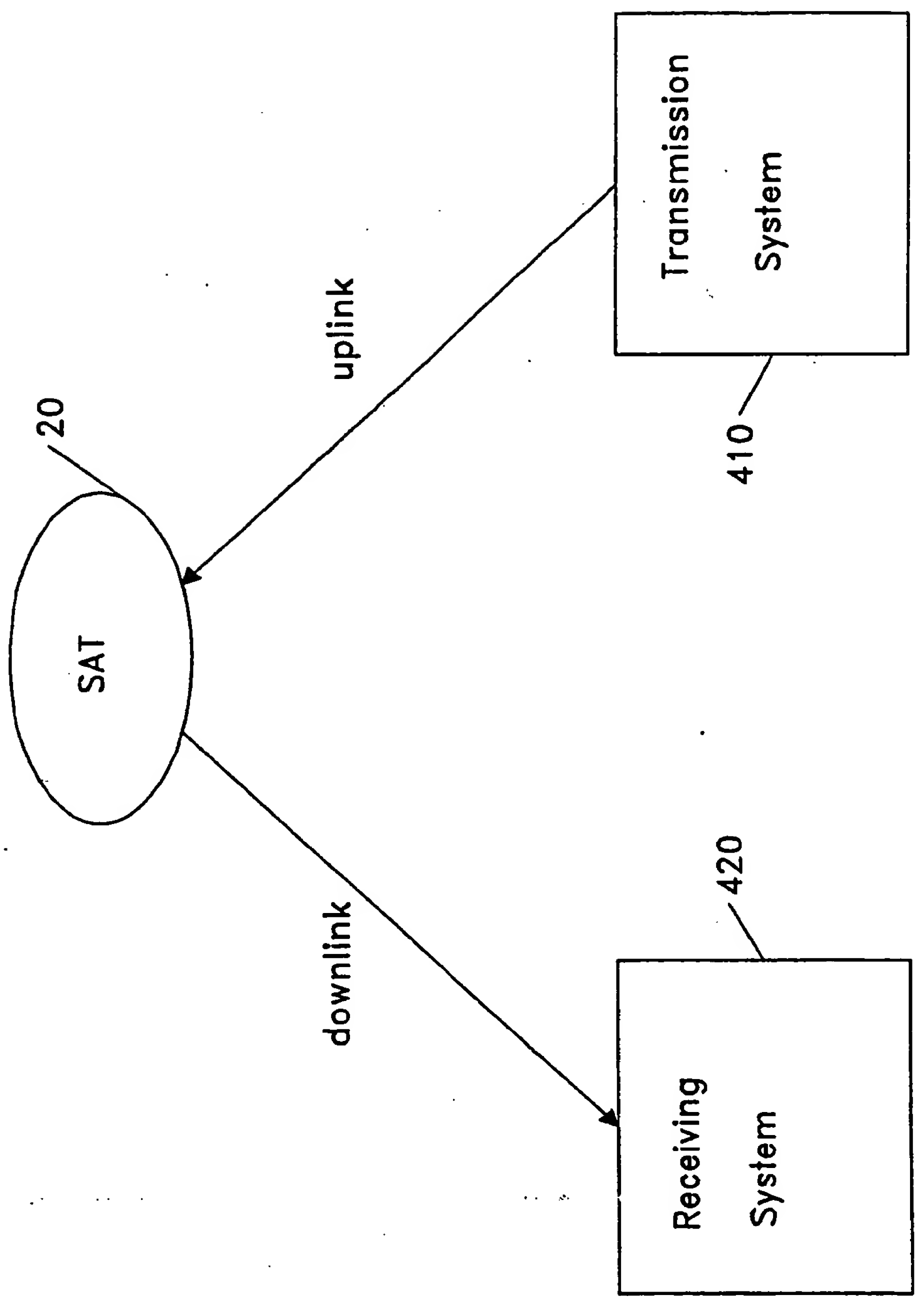

Transmission System
410
uplink
20
SAT
downlink
420
Receiving System

FIGURE 3B

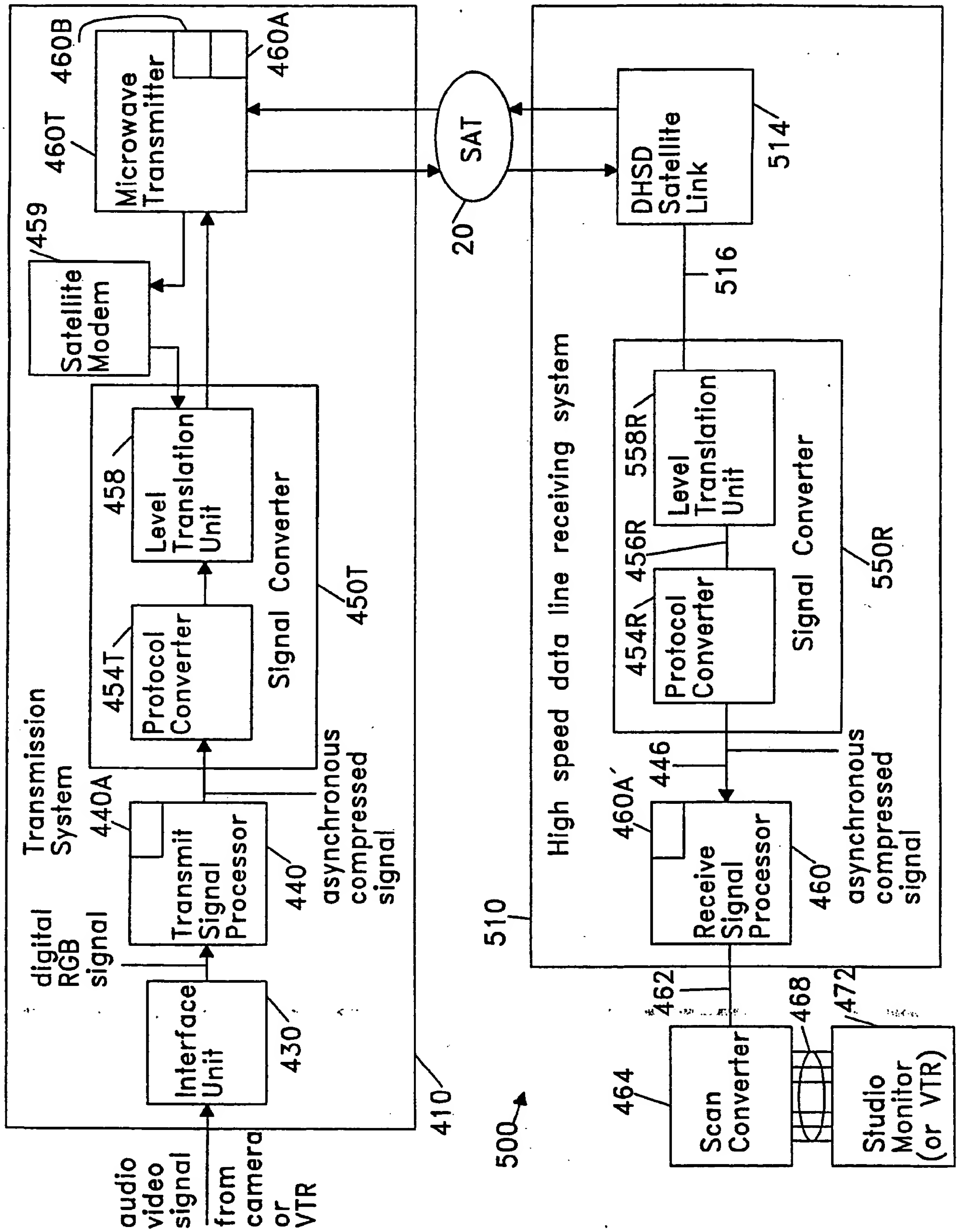

Transmission System
Interface Unit
430
audio video signal
from camera or VTR
digital RGB signal
Transmit Signal Processor
440A
440
asynchronous compressed signal
Protocol Converter
454T
Level Translation Unit
458
Signal Converter
450T
Satellite Modem
459
Microwave Transmitter
460T
460B
460A
410
SAT
20
500
High speed data line receiving system
510
DHSD Satellite Link
514
516
Level Translation Unit
558R
456R
Protocol Converter
454R
Signal Converter
550R
446
460A´
Receive Signal Processor
460
asynchronous compressed signal
462
Scan Converter
464
468
472
Studio Monitor (or VTR)

FIGURE 4A

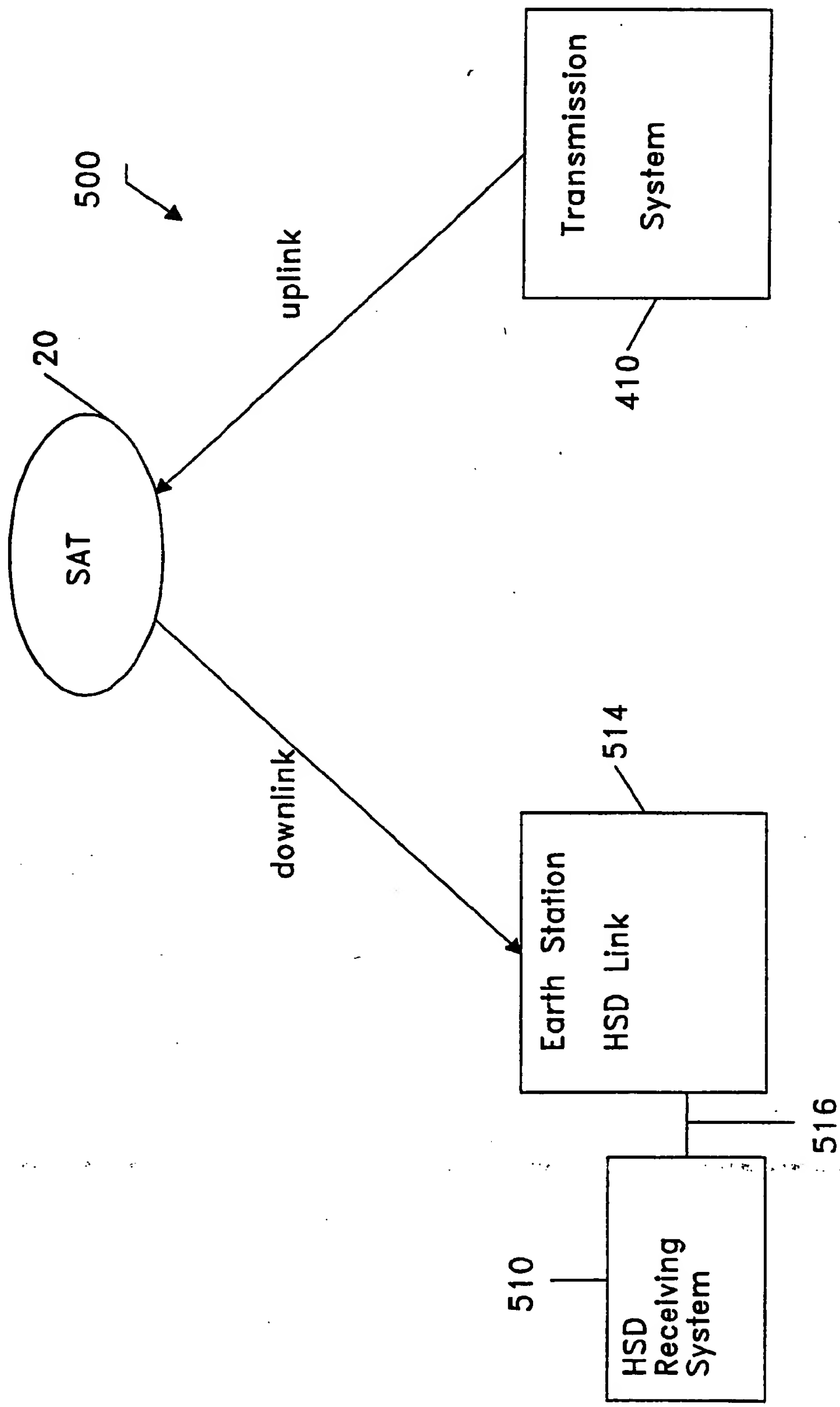

500
SAT
20
uplink
downlink
Transmission System
410
Earth Station
HSD Link
514
516
HSD Receiving System
510

FIGURE 4B

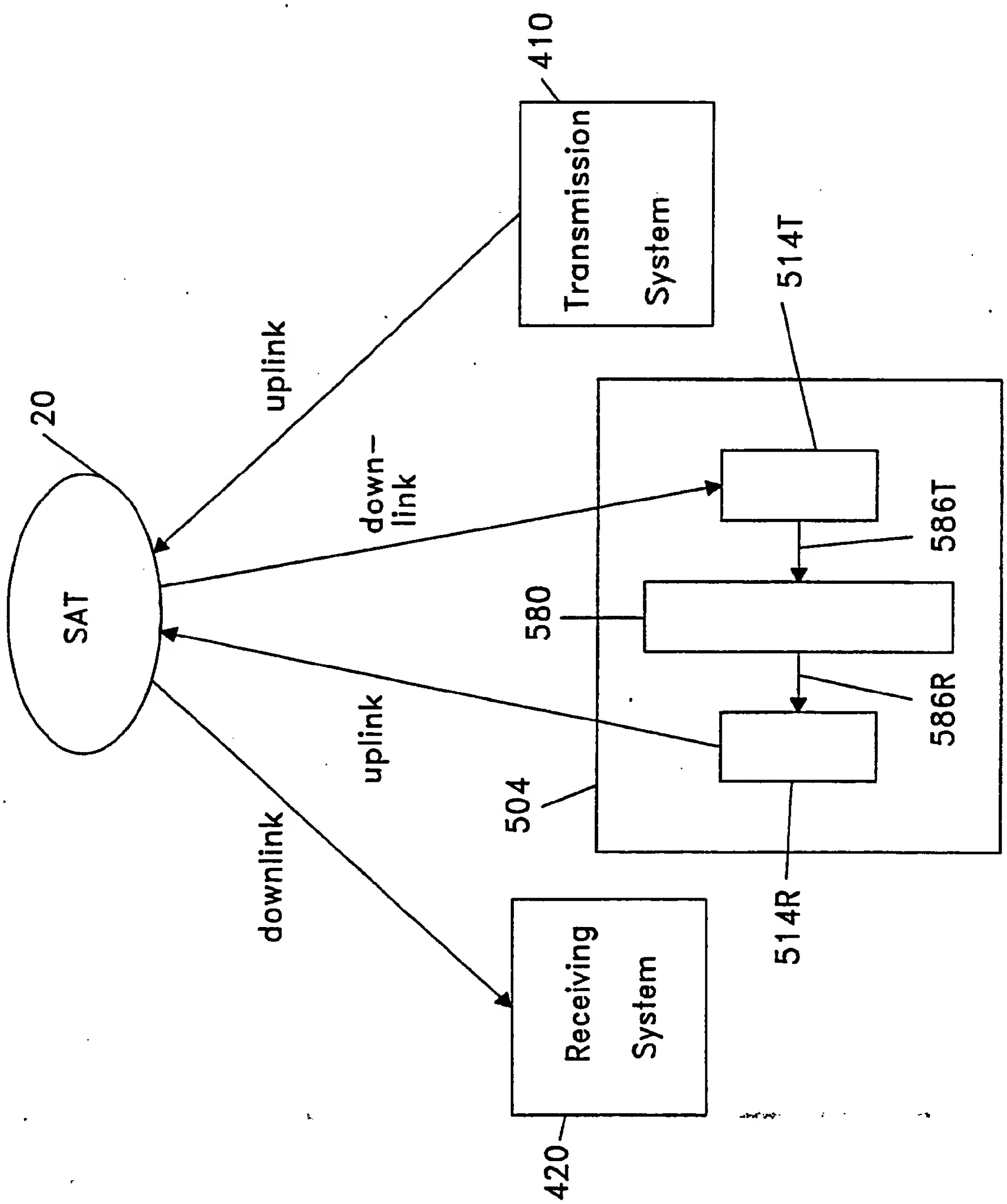

SAT
20
uplink
downlink
Transmission
System
410
down-
link
uplink
514T
586T
580
586R
504
514R
downlink
Receiving
System
420

FIGURE 5A

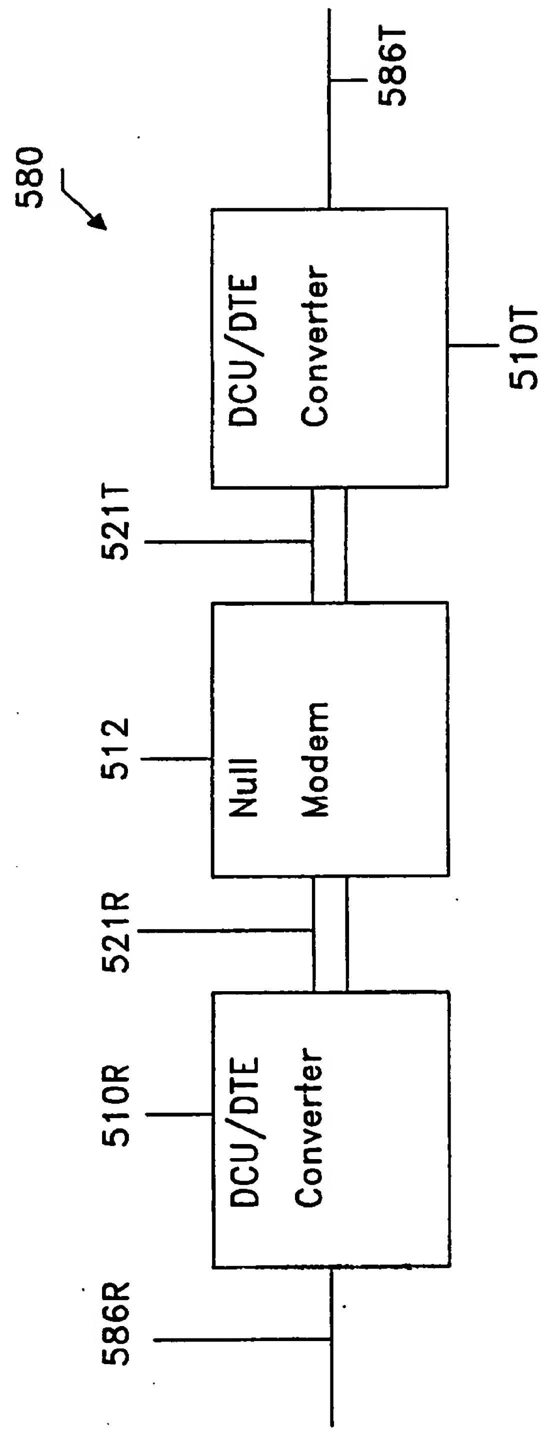

580
586T
DCU/DTE Converter
510T
521T
Null Modem
512
521R
DCU/DTE Converter
510R
586R

FIGURE 5B

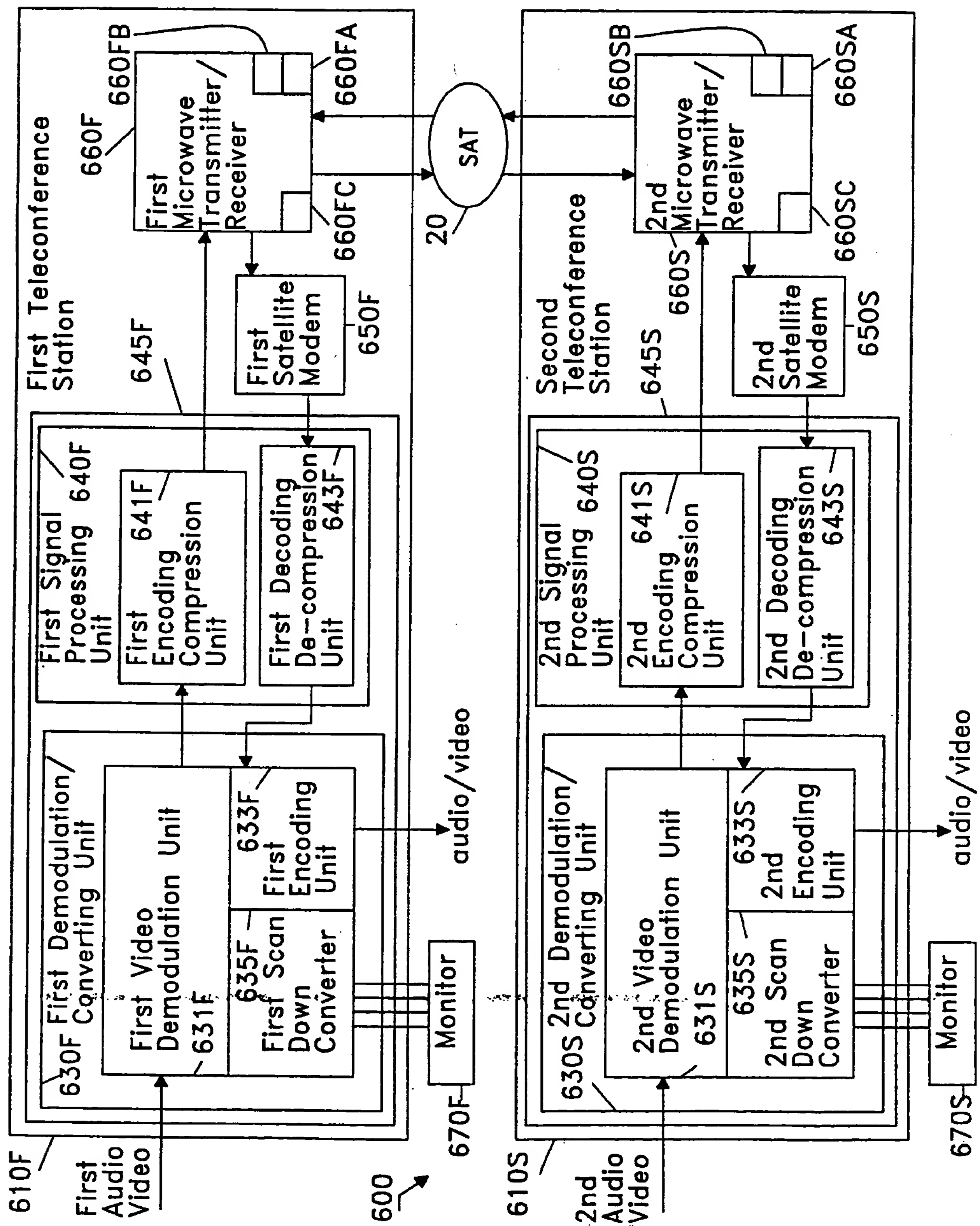

First Teleconference Station
First Microwave Transmitter/Receiver
660F
660FB
660FA
660FC
SAT
20
First Satellite Modem
650F
645F
First Signal Processing Unit 640F
First Encoding Compression Unit 641F
First Decoding De-compression Unit 643F
First Demodulation/Converting Unit
630F
First Video Demodulation Unit 631F
633F First Encoding Unit
635F First Scan Down Converter
audio/video
Monitor
670F
610F
First Audio Video
600
Second Teleconference Station
2nd Microwave Transmitter/Receiver
660S
660SB
660SA
660SC
2nd Satellite Modem
650S
645S
2nd Signal Processing Unit 640S
2nd Encoding Compression Unit 641S
2nd Decoding De-compression Unit 643S
2nd Demodulation/Converting Unit
630S
2nd Video Demodulation Unit 631S
633S 2nd Encoding Unit
635S 2nd Scan Down Converter
audio/video
Monitor
670S
610S
2nd Audio Video

FIGURE 6A

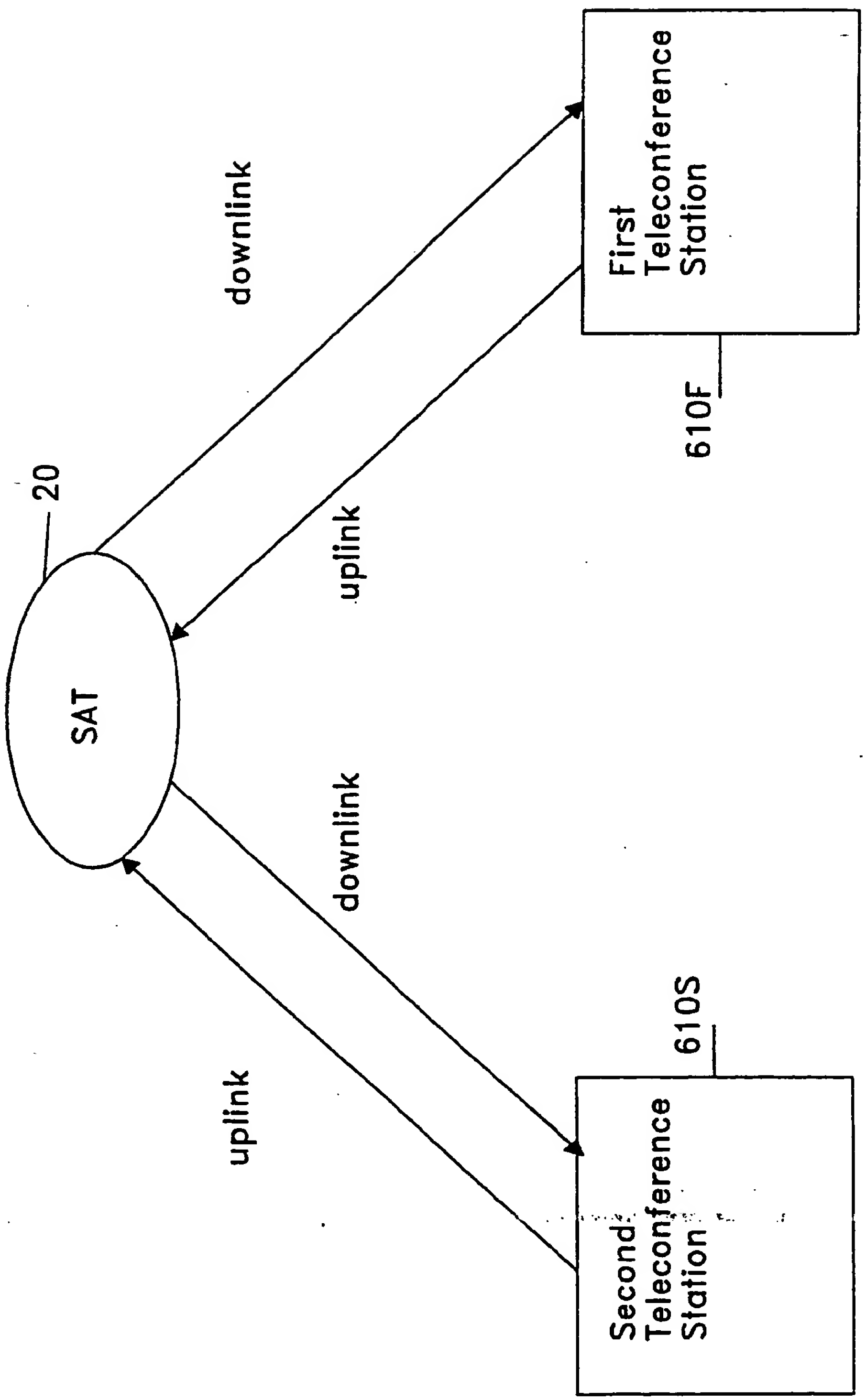

SAT
20
downlink
uplink
First Teleconference Station
610F
downlink
uplink
Second Teleconference Station
610S

FIGURE 6B

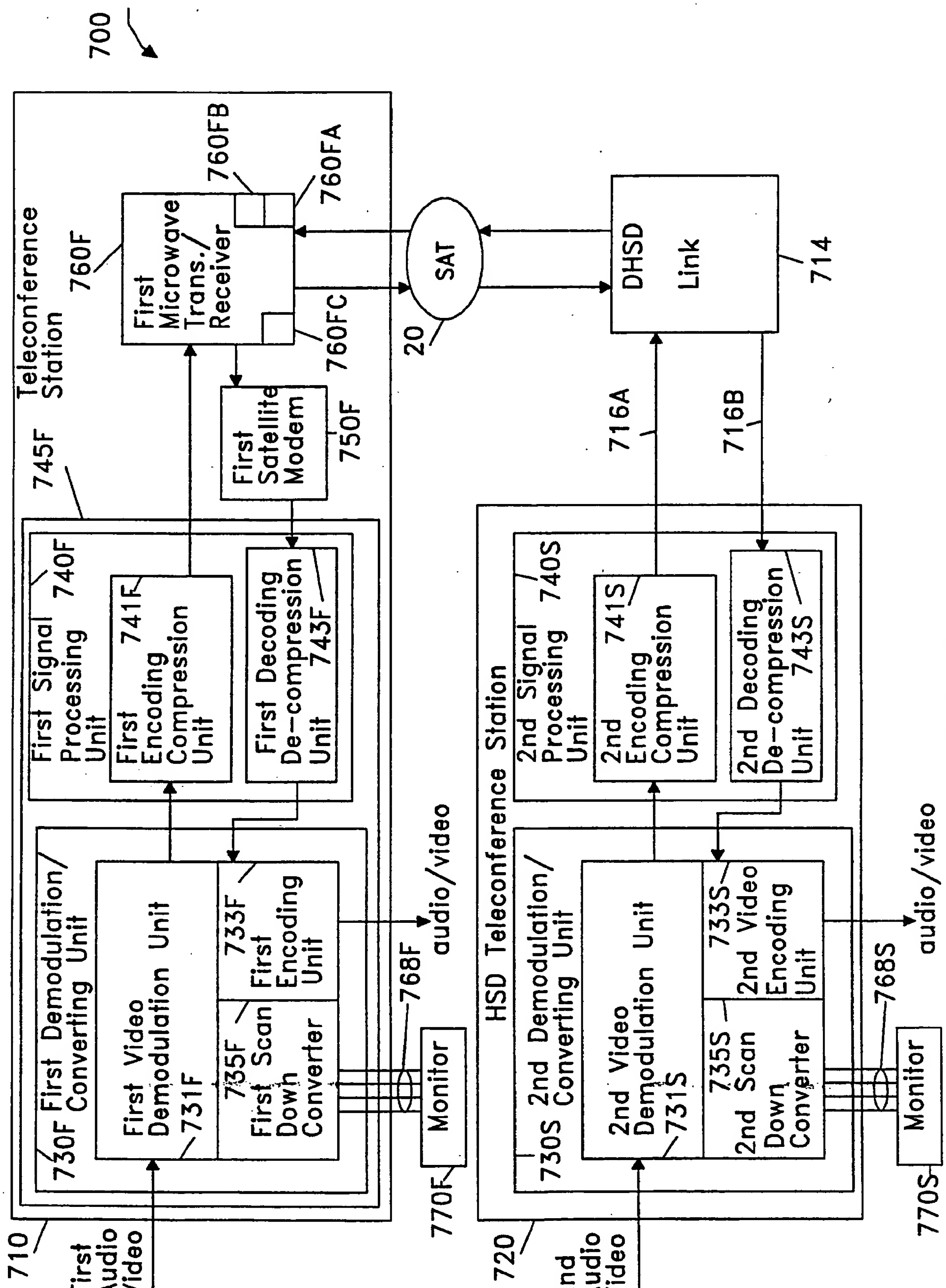

700
Teleconference Station
760F
First Microwave Trans./ Receiver
760FB
760FA
760FC
SAT
20
DHSD Link
714
First Satellite Modem
750F
745F
First Signal Processing Unit
740F
First Encoding Compression Unit
741F
First Decoding De-compression Unit
743F
716A
716B
First Demodulation/ Converting Unit
730F
First Video Demodulation Unit
731F
733F
First Encoding Unit
735F
First Scan Down Converter
768F
audio/video
Monitor
770F
710
First Audio Video
HSD Teleconference Station
2nd Signal Processing Unit
740S
2nd Encoding Compression Unit
741S
2nd Decoding De-compression Unit
743S
2nd Demodulation/ Converting Unit
730S
2nd Video Demodulation Unit
731S
733S
2nd Video Encoding Unit
735S
2nd Scan Down Converter
768S
audio/video
Monitor
770S
720
2nd Audio Video

FIGURE 7A

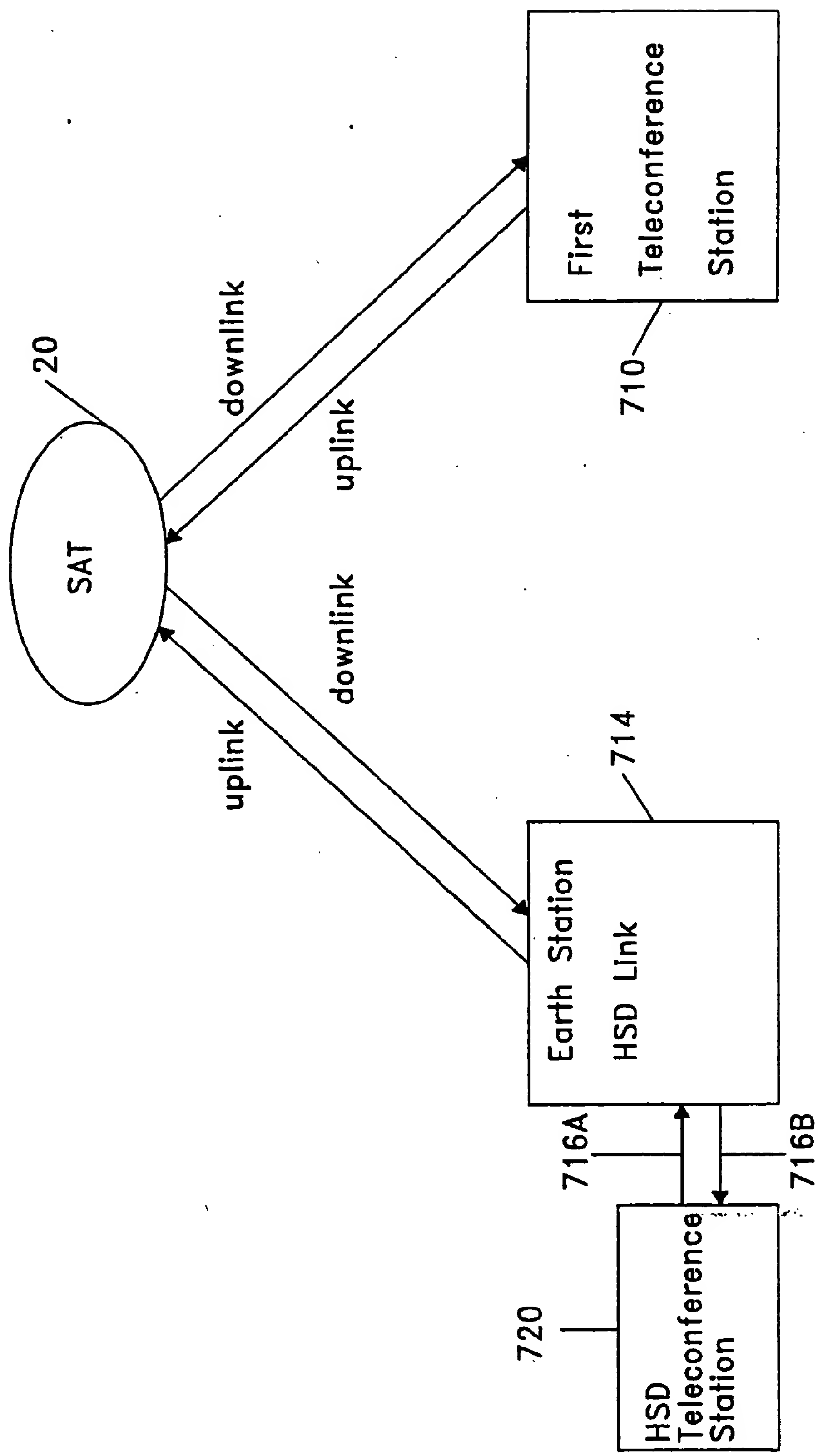
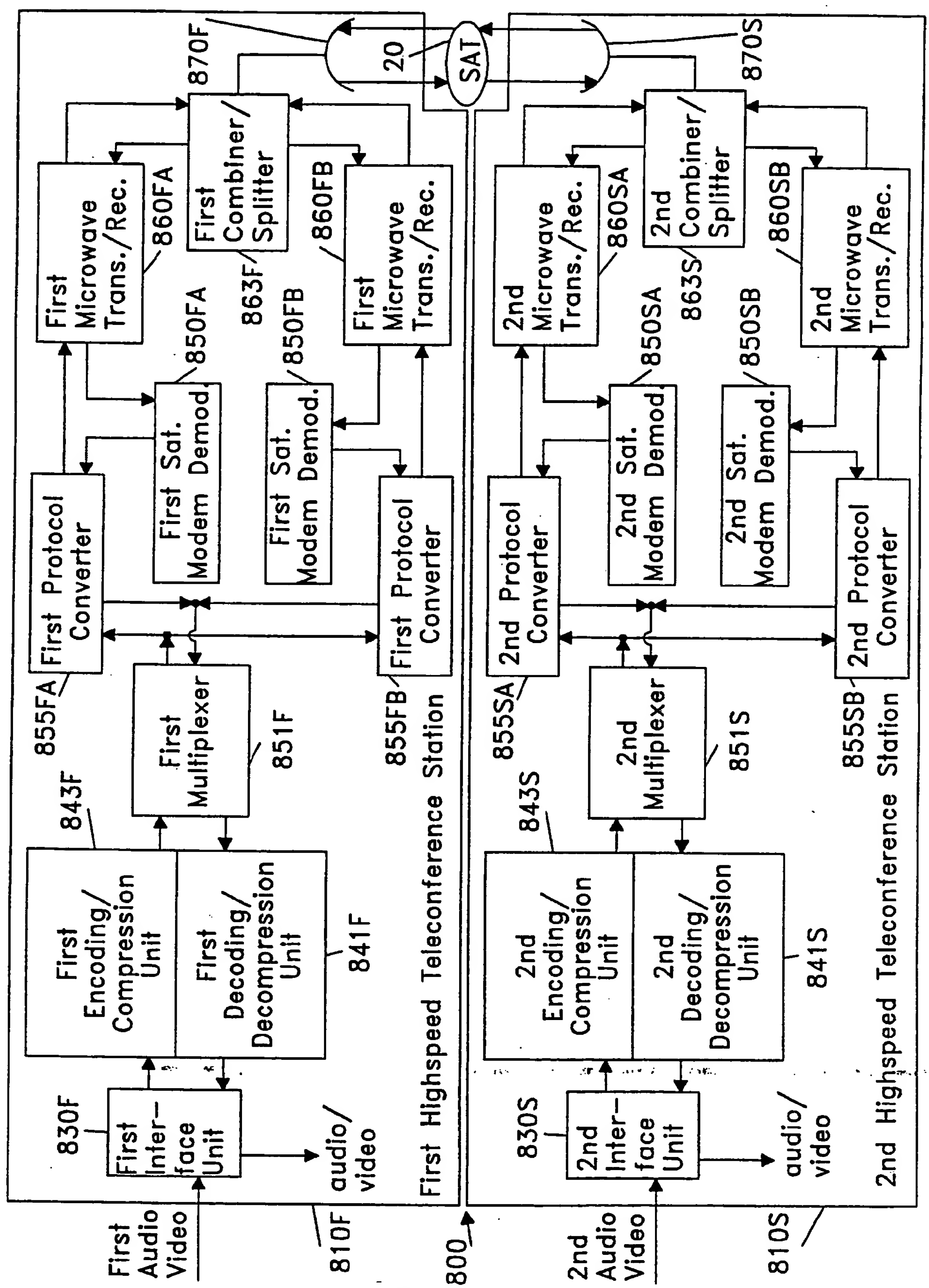

20
SAT
downlink
uplink
downlink
uplink
First Teleconference Station
710
714
Earth Station
HSD Link
716A
716B
720
HSD Teleconference Station

FIGURE 7B



SAT
20
870F
870S
First Combiner/ Splitter
863F
First Microwave Trans./Rec.
860FA
860FB
First Sat. Modem Demod.
850FA
850FB
First Protocol Converter
855FA
855FB
First Multiplexer
851F
843F
First Encoding/ Compression Unit
First Decoding/ Decompression Unit
841F
830F
First Inter-face Unit
audio/ video
First Highspeed Teleconference Station
First Audio Video
810F
800
2nd Combiner/ Splitter
863S
2nd Microwave Trans./Rec.
860SA
860SB
2nd Sat. Modem Demod.
850SA
850SB
2nd Protocol Converter
855SA
855SB
2nd Multiplexer
851S
843S
2nd Encoding/ Compression Unit
2nd Decoding/ Decompression Unit
841S
830S
2nd Inter-face Unit
audio/ video
2nd Highspeed Teleconference Station
2nd Audio Video
810S

FIGURE 8

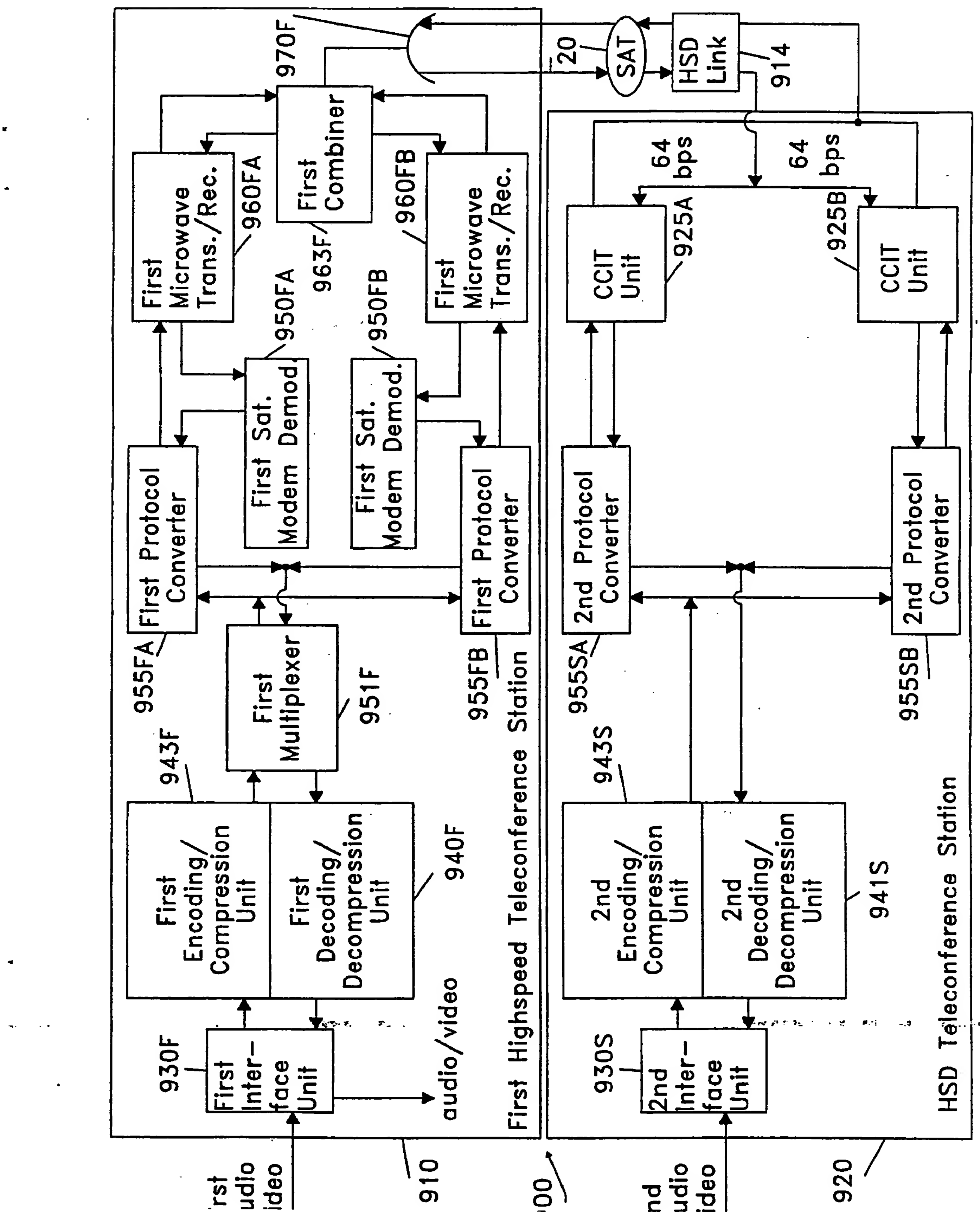

First audio video
910
First Inter-face Unit
930F
audio/video
First Encoding/ Compression Unit
First Decoding/ Decompression Unit
943F
940F
First Multiplexer
951F
First Protocol Converter
955FA
First Protocol Converter
955FB
First Sat. Modem Demod
First Sat. Modem Demod.
950FA
950FB
First Microwave Trans./Rec.
960FA
First Microwave Trans./Rec.
960FB
First Combiner
963F
970F
First Highspeed Teleconference Station
20
SAT
HSD Link
914
64 bps
64 bps
CCIT Unit
925A
CCIT Unit
925B
2nd Protocol Converter
955SA
2nd Protocol Converter
955SB
943S
2nd Encoding/ Compression Unit
2nd Decoding/ Decompression Unit
941S
930S
2nd Inter-face Unit
2nd audio video
HSD Teleconference Station
920
900

FIGURE 9

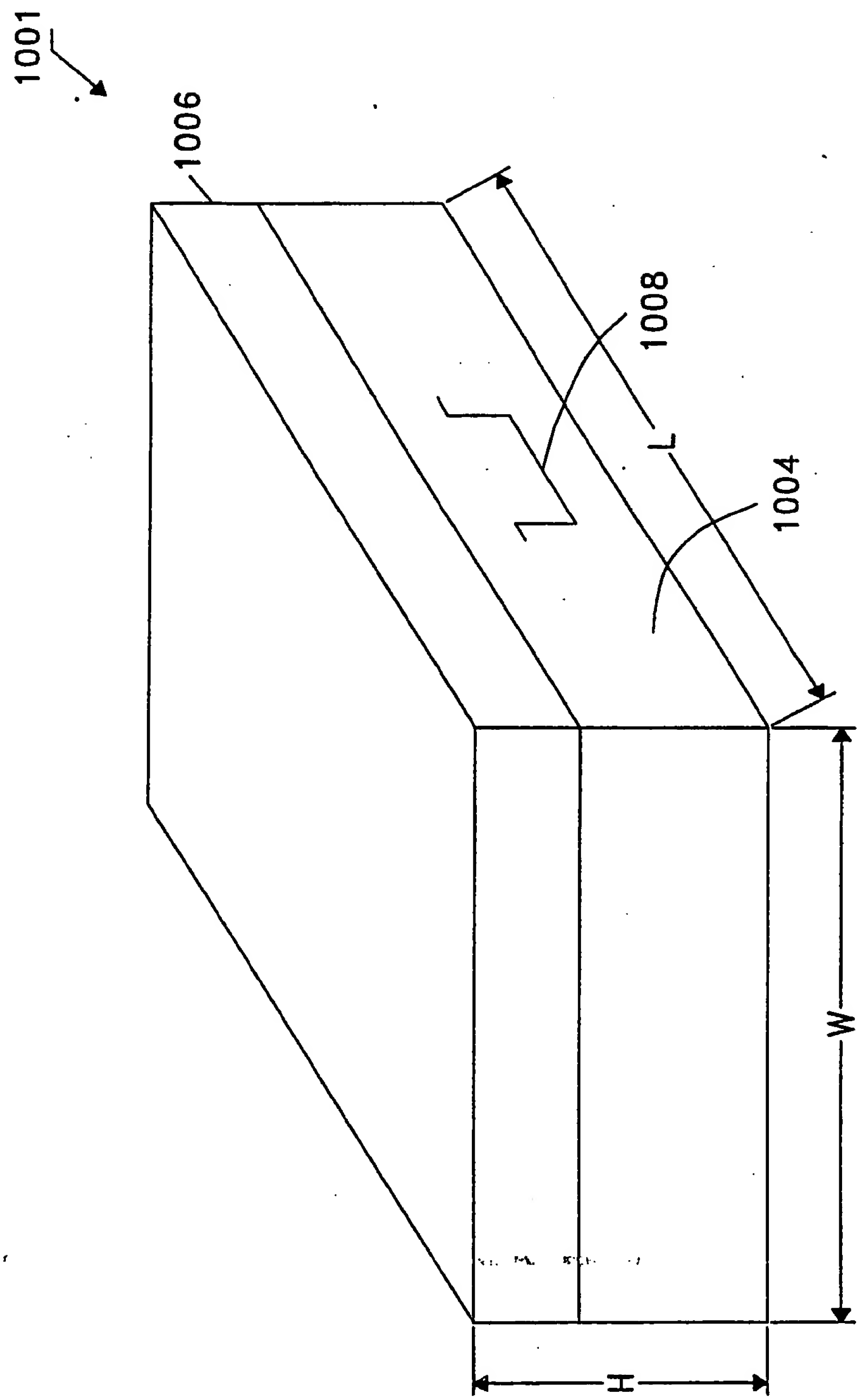


FIGURE 10A

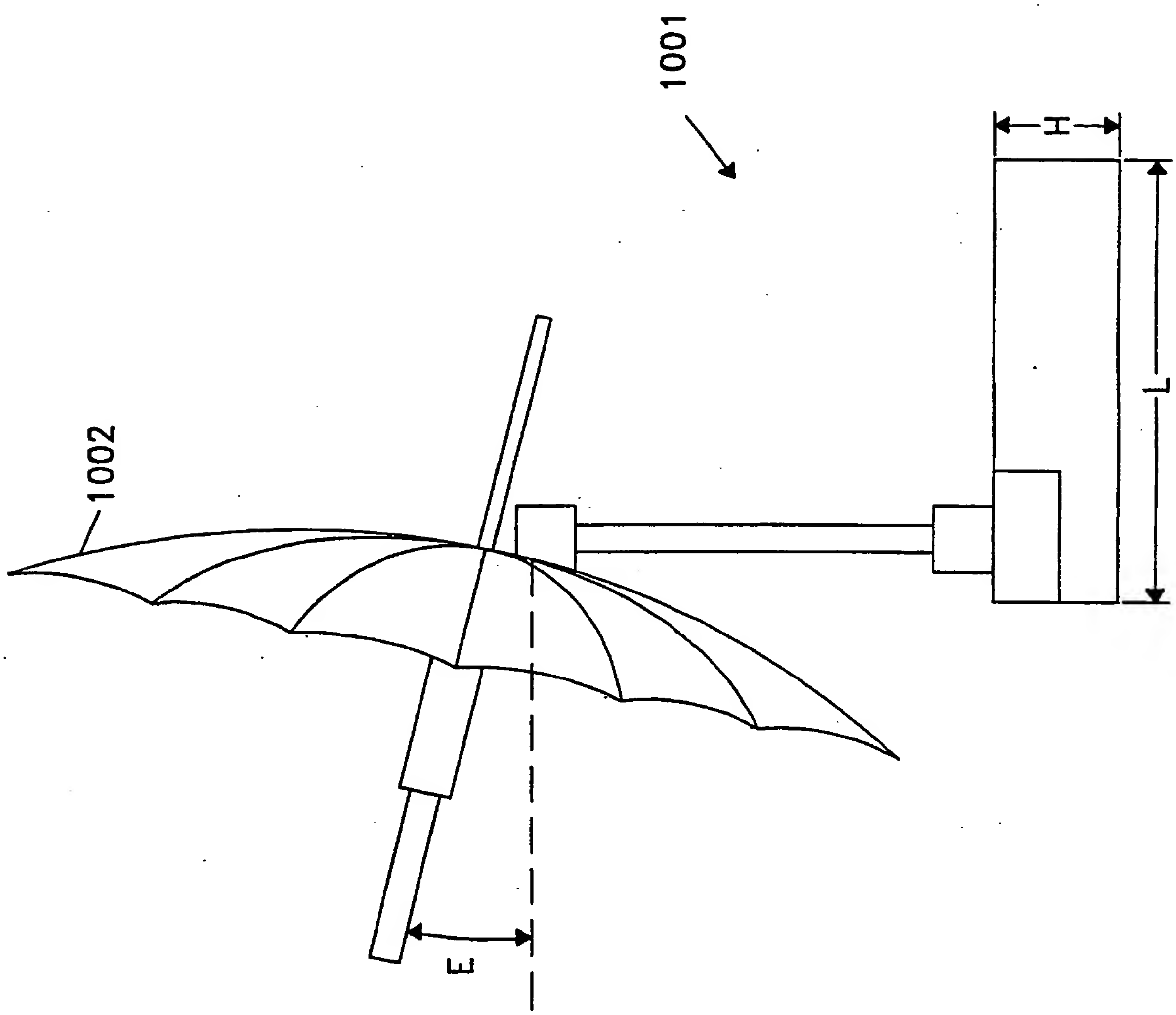


FIGURE 10B

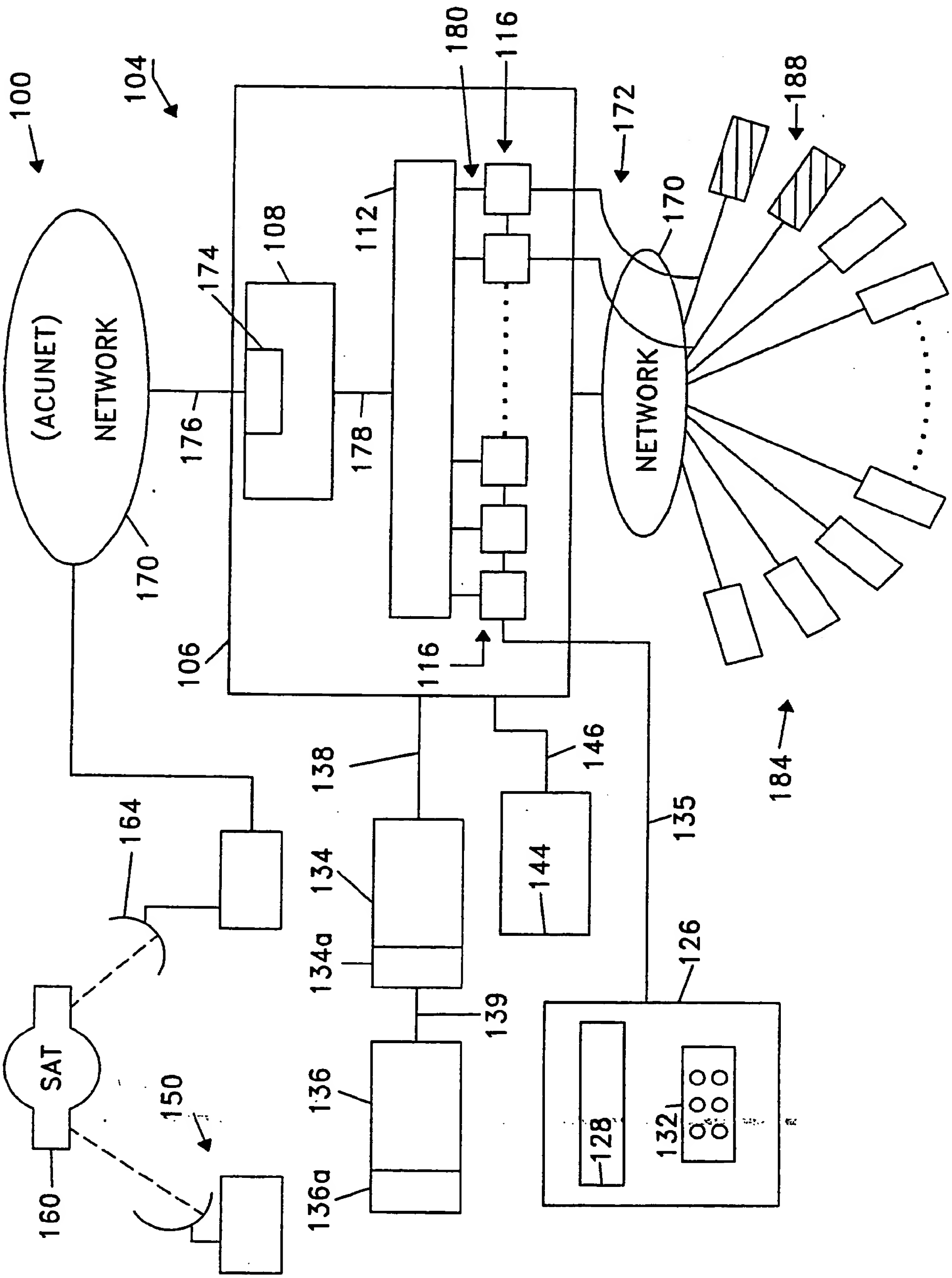

100
104
(ACUNET)
NETWORK
170
174
108
176
178
112
180
116
106
116
172
170
NETWORK
188
184
138
146
144
135
164
134
134a
139
126
128
132
SAT
150
160
136
136a

FIGURE 11A

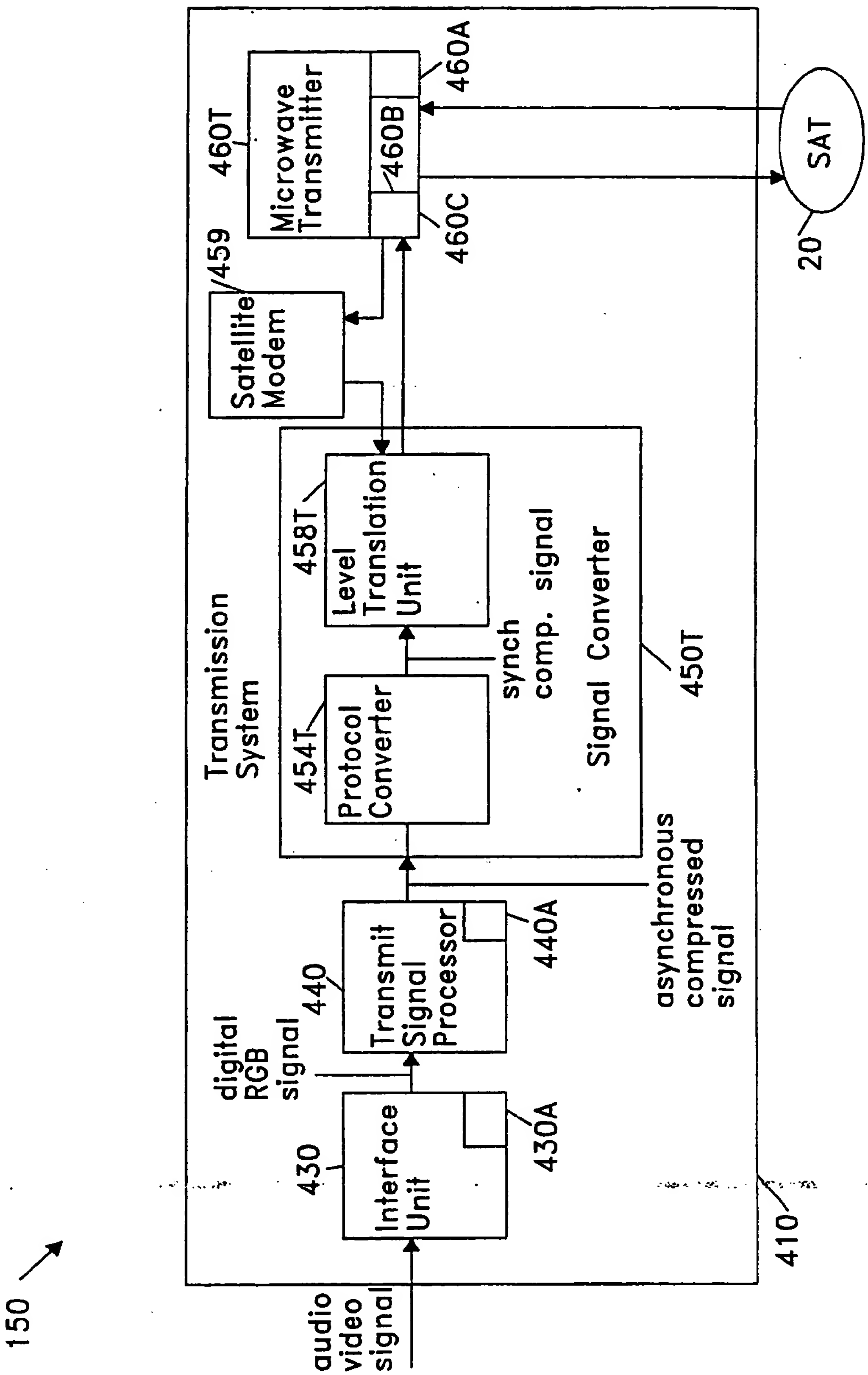

150
audio
video
signal
Interface
Unit
430
430A
digital
RGB
signal
Transmit
Signal
Processor
440
440A
asynchronous
compressed
signal
Transmission
System
Protocol
Converter
454T
synch
comp. signal
Level
Translation
Unit
458T
Signal Converter
450T
Satellite
Modem
459
Microwave
Transmitter
460T
460A
460B
460C
SAT
20
410

FIGURE 11B

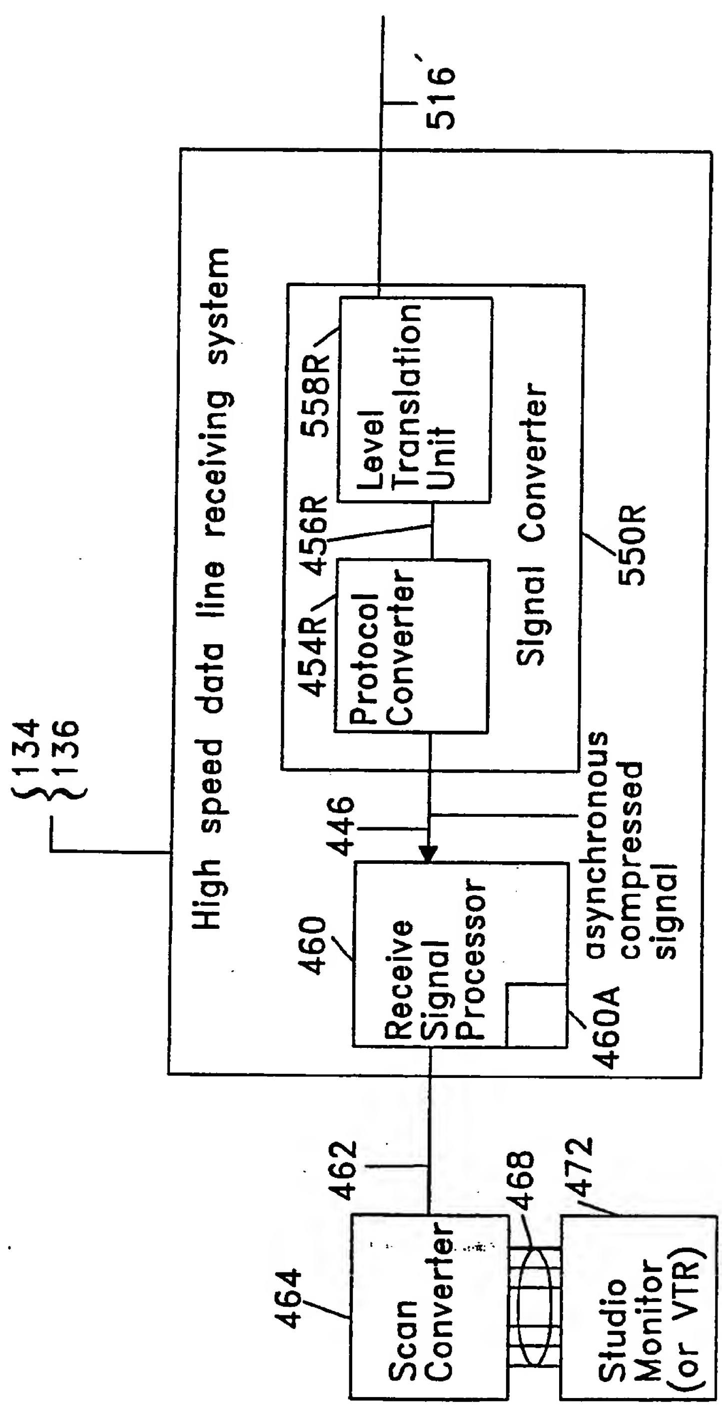

516
High speed data line receiving system
134
136
Level Translation Unit
558R
456R
Protocol Converter
454R
Signal Converter
550R
446
asynchronous compressed signal
Receive Signal Processor
460
460A
462
Scan Converter
464
468
472
Studio Monitor (or VTR)

FIGURE 11C

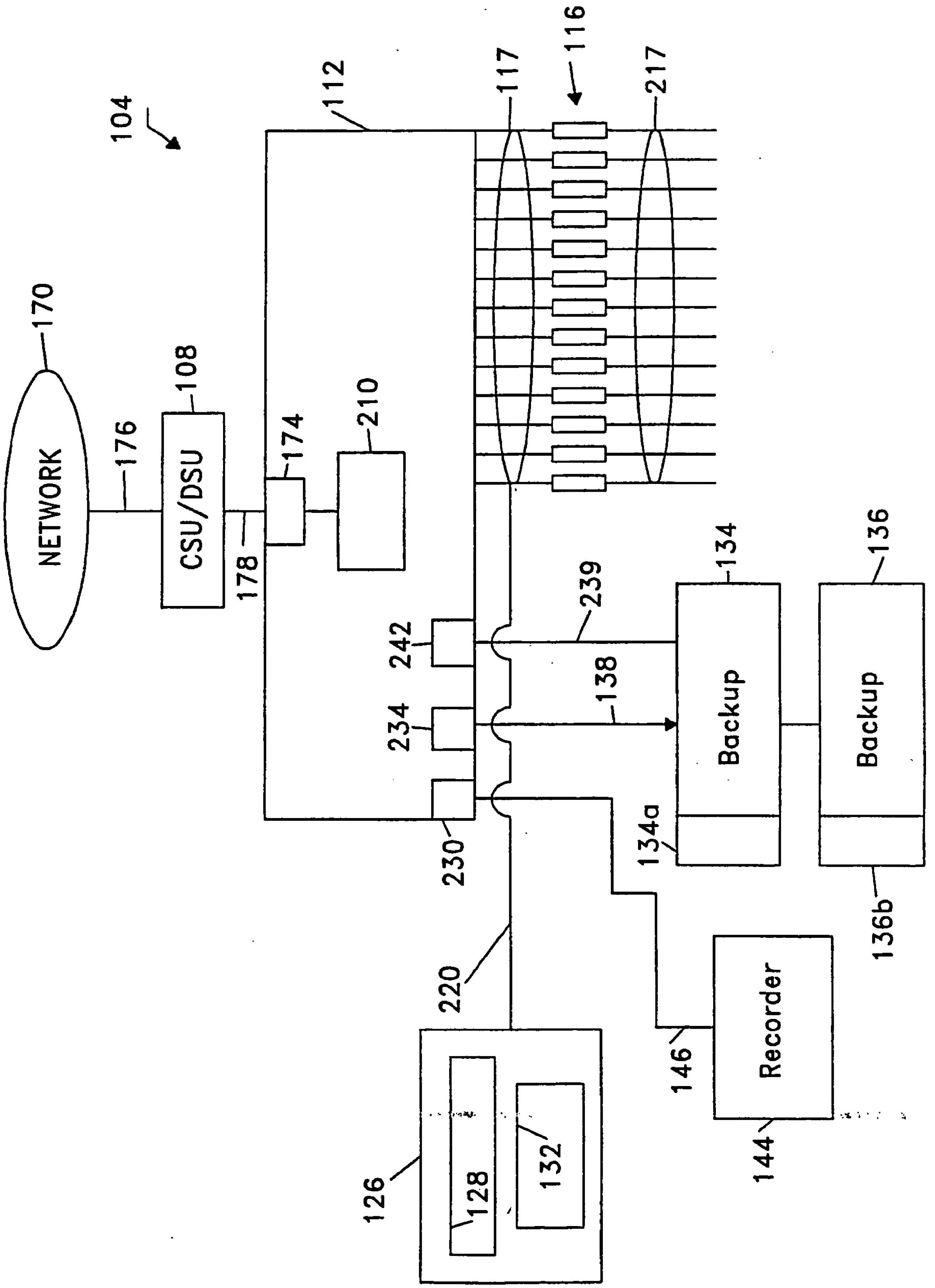

104
112
117
116
217
170
NETWORK
176
CSU/DSU
108
178
174
210
242
234
230
239
138
134
Backup
134a
136
Backup
136b
220
126
128
132
146
Recorder
144

FIGURE 12

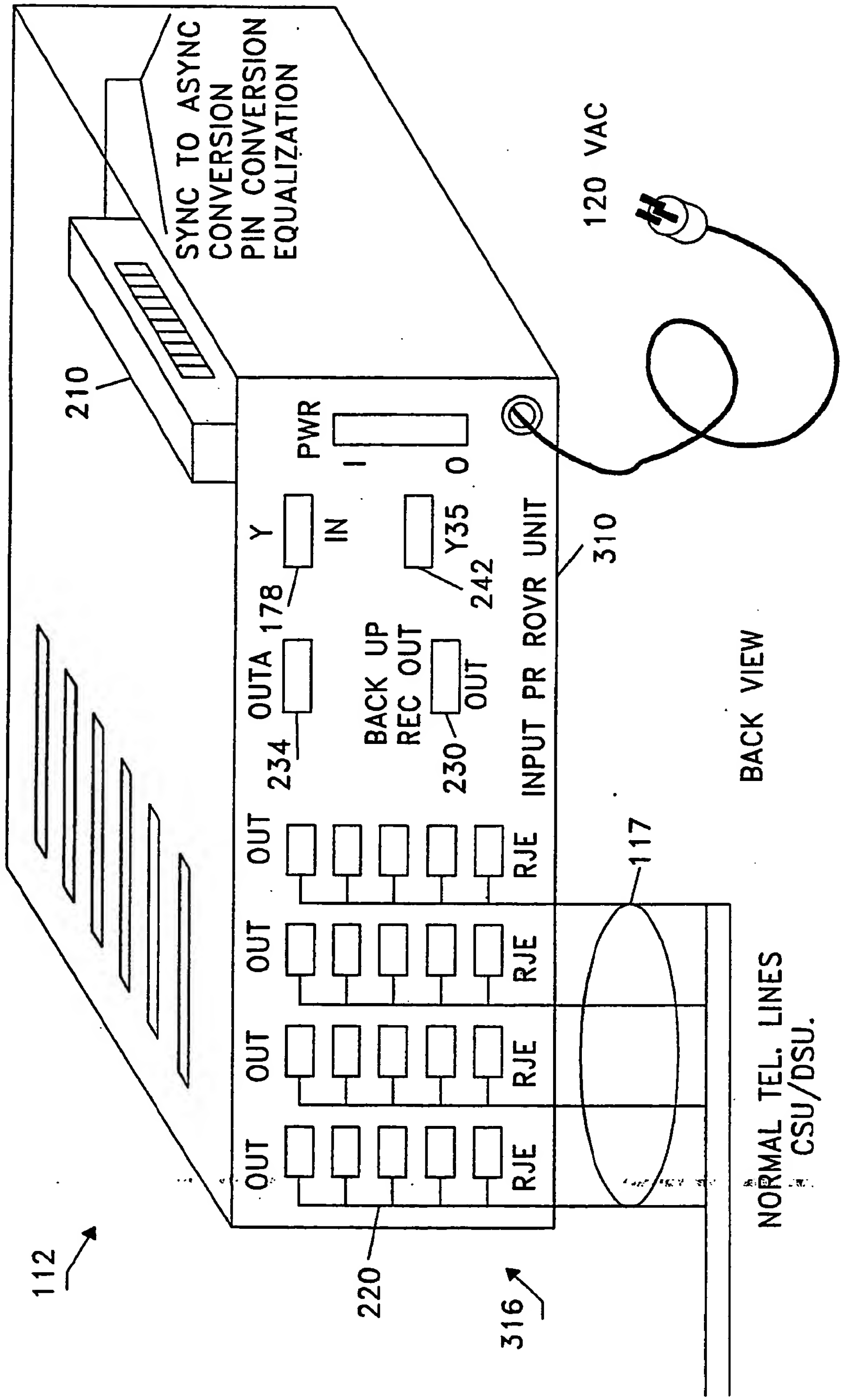

SYNC TO ASYNC
CONVERSION
PIN CONVERSION
EQUALIZATION
120 VAC
210
PWR
I
O
Y
IN
178
Y35
242
OUTA
234
BACK UP
REC OUT
OUT
230
INPUT PR ROVR UNIT
310
BACK VIEW
OUT
RJE
OUT
RJE
OUT
RJE
OUT
RJE
117
NORMAL TEL. LINES
CSU/DSU.
112
220
316

FIGURE 13A

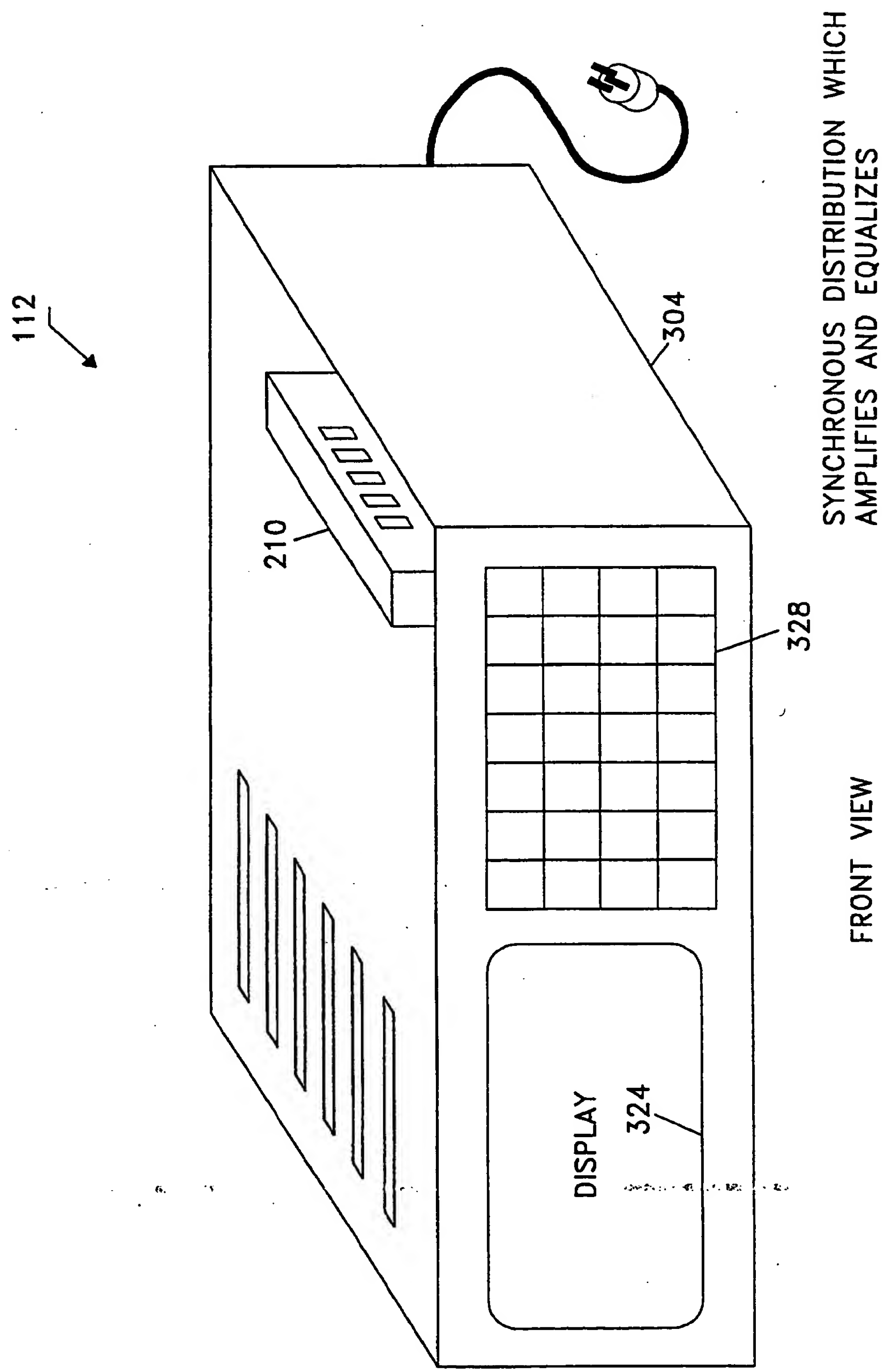

112
304
210
328
SYNCHRONOUS DISTRIBUTION WHICH AMPLIFIES AND EQUALIZES
FRONT VIEW
DISPLAY
324

FIGURE 13B

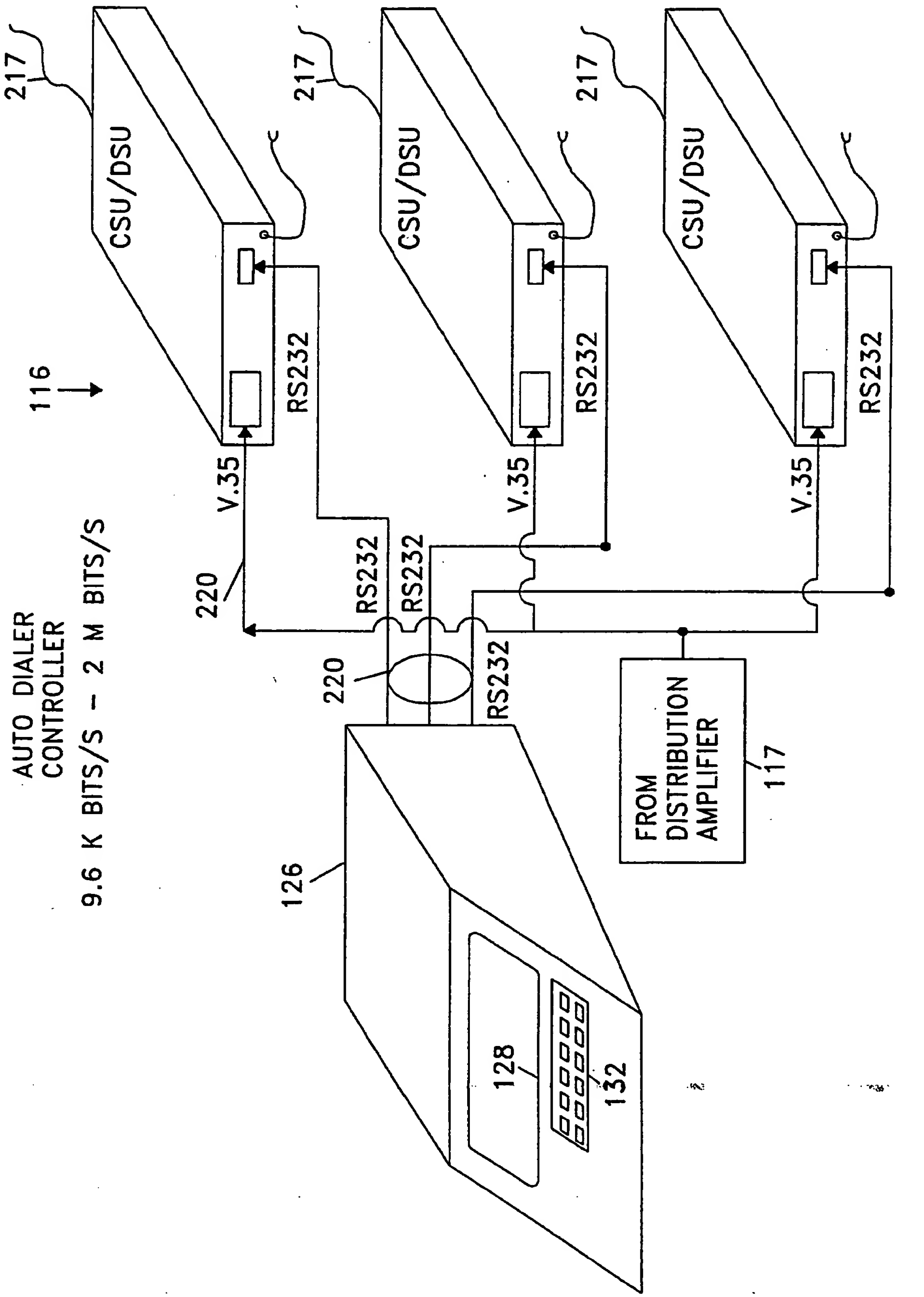

217
217
217
CSU/DSU
CSU/DSU
CSU/DSU
116
RS232
RS232
RS232
V.35
V.35
V.35
AUTO DIALER
CONTROLLER
9.6 K BITS/S – 2 M BITS/S
220
RS232
RS232
220
RS232
FROM
DISTRIBUTION
AMPLIFIER
117
126
128
132

FIGURE 14

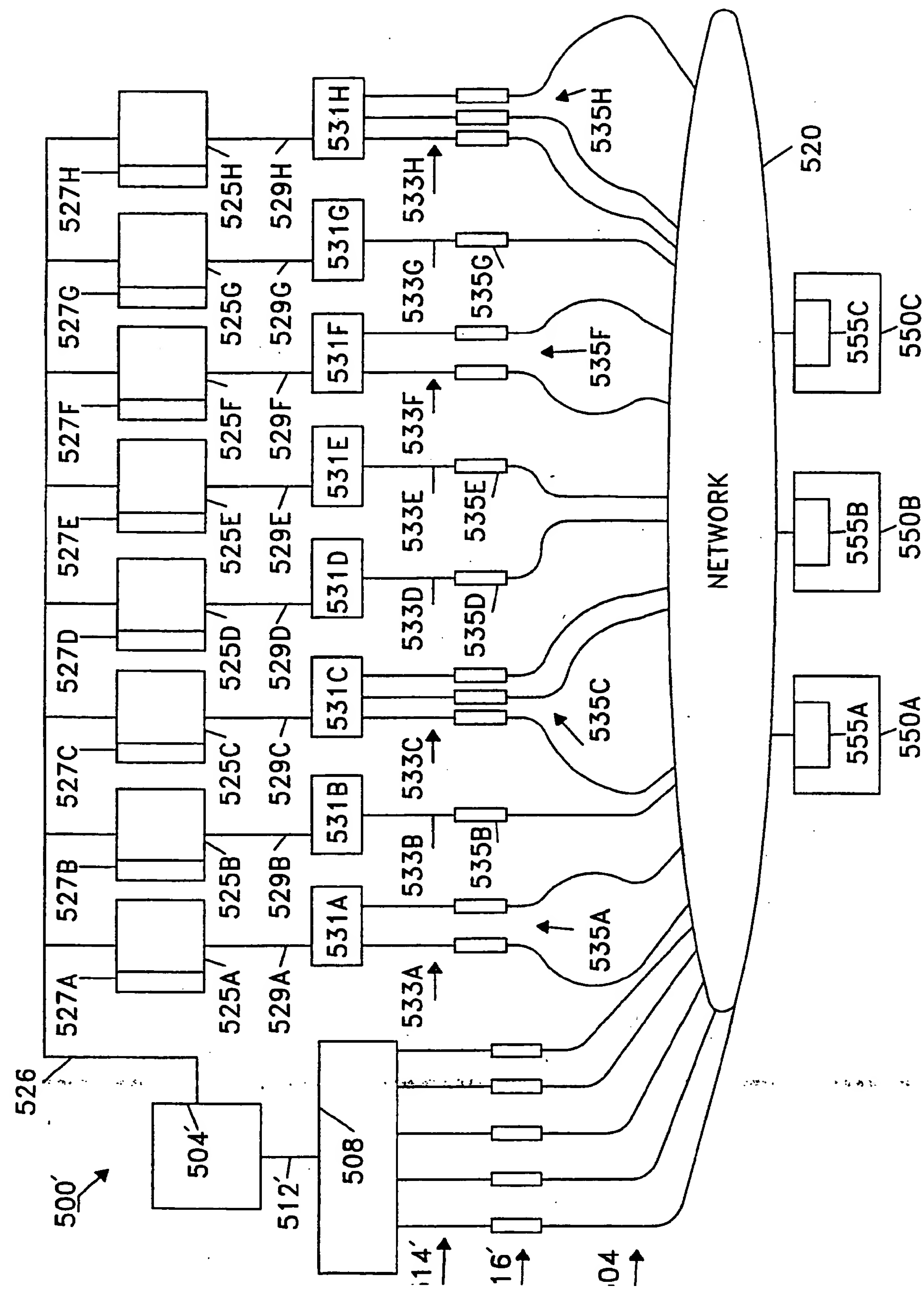

500'
504'
508
512'
526
527A
527B
527C
527D
527E
527F
527G
527H
525A
525B
525C
525D
525E
525F
525G
525H
529A
529B
529C
529D
529E
529F
529G
529H
531A
531B
531C
531D
531E
531F
531G
531H
533A
533B
533C
533D
533E
533F
533G
533H
535A
535B
535C
535D
535E
535F
535G
535H
520
NETWORK
550A
550B
550C
555A
555B
555C

FIGURE 15

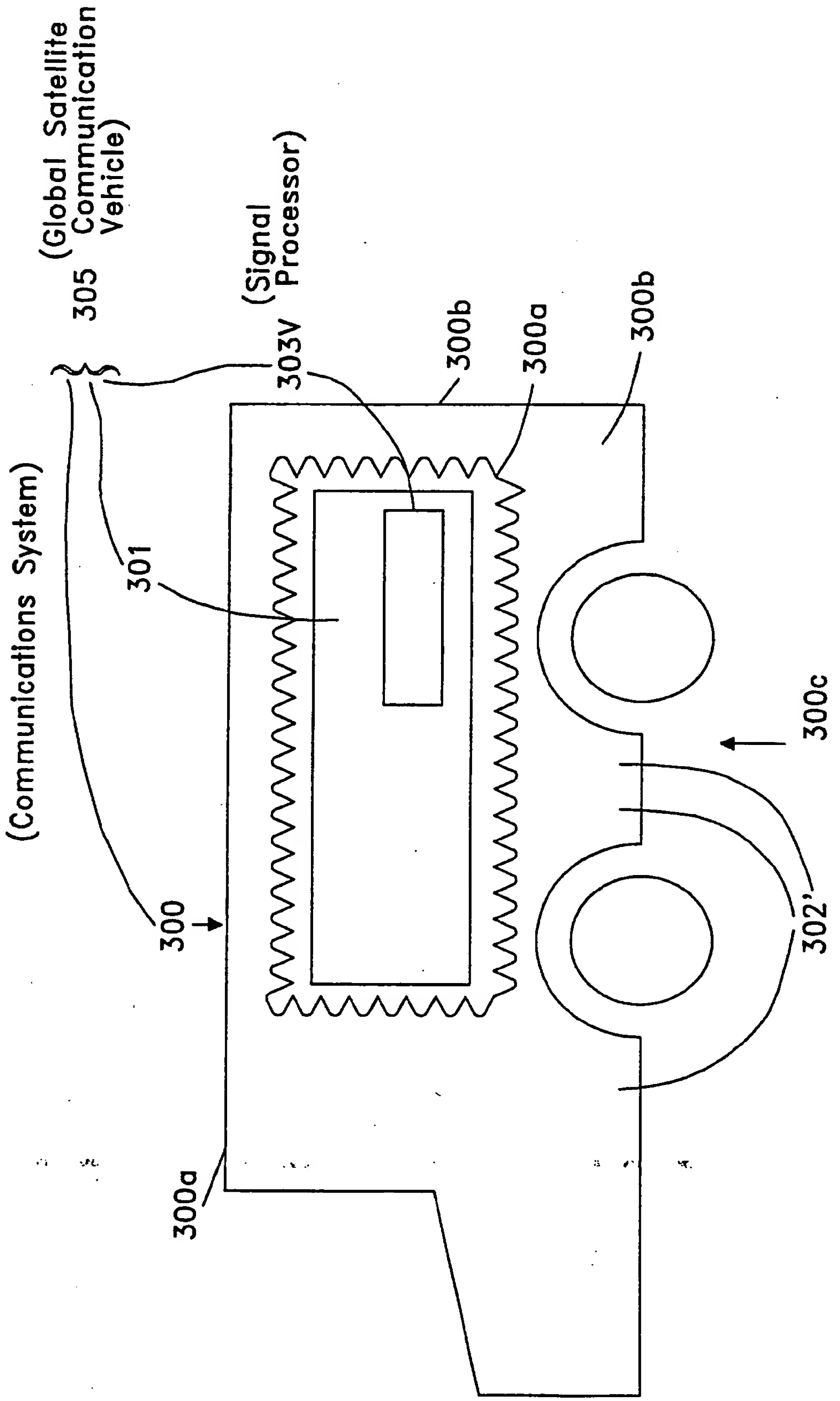

305 (Global Satellite Communication Vehicle)
303V (Signal Processor)
300b
300a
300b
(Communications System)
301
300
300c
302'
300a

FIGURE 16A

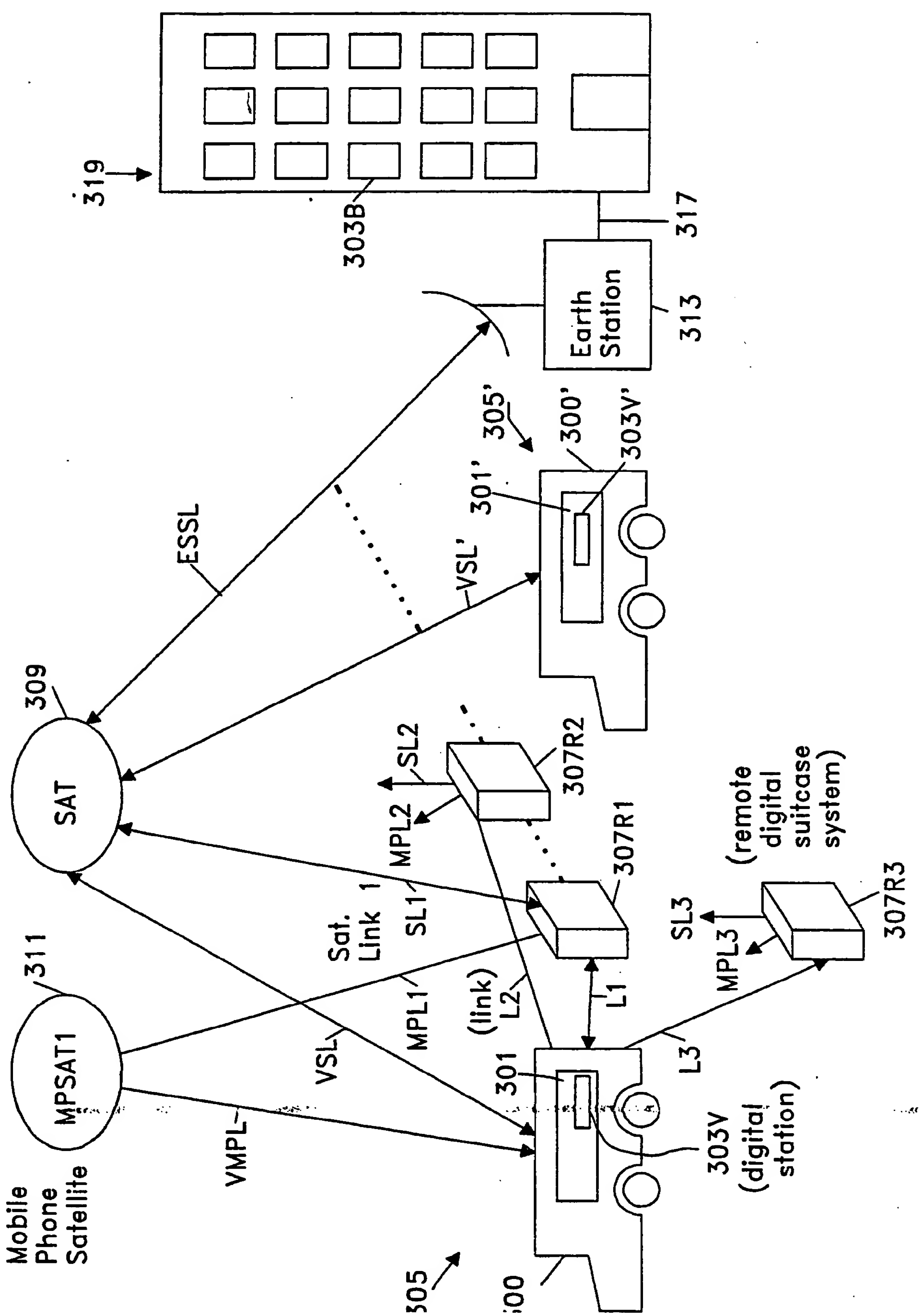

319
303B
317
Earth Station
313
ESSL
305'
300'
303V'
301'
VSL'
309
SAT
SL2
307R2
MPL2
307R1
Sat. Link 1
SL1
(remote digital suitcase system)
SL3
MPL3
307R3
311
MPSAT1
MPL1
(link) L2
L1
L3
VSL
301
303V (digital station)
VMPL
Mobile Phone Satellite
305
300

FIGURE 16B

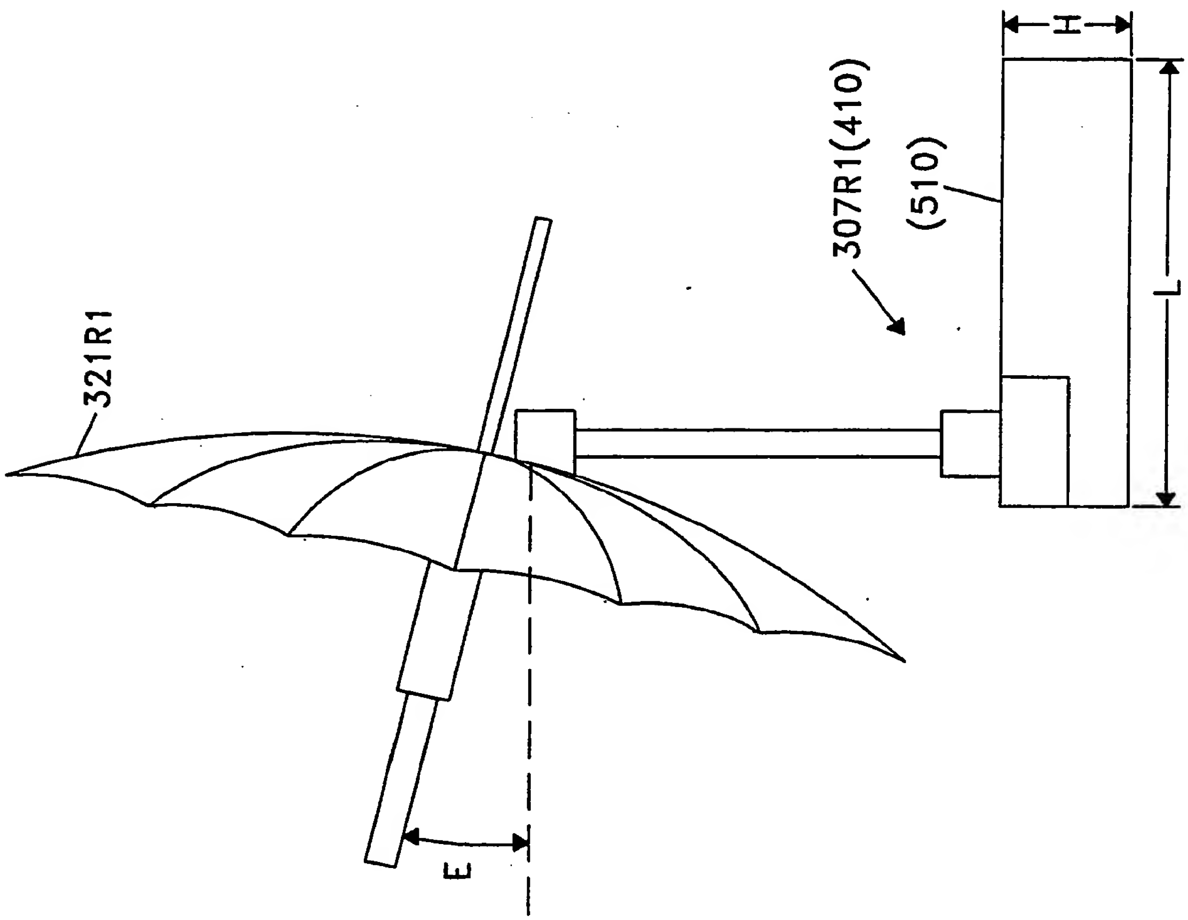


FIGURE 16C

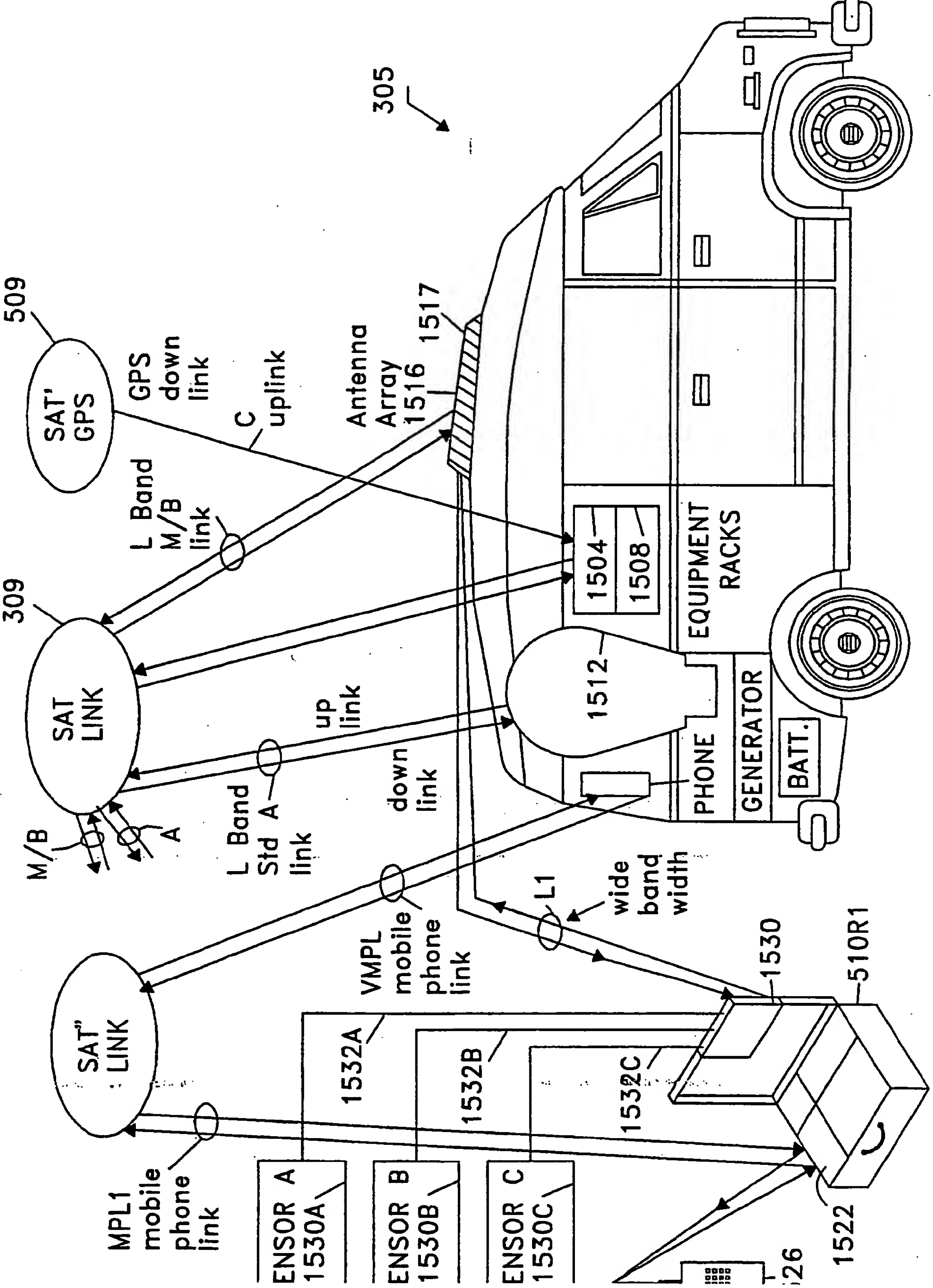

305
509
SAT' GPS
GPS down link
C uplink
Antenna Array 1516
1517
L Band M/B link
309
SAT LINK
1504
1508
EQUIPMENT RACKS
1512
up link
down link
L Band Std A link
M/B
A
PHONE
GENERATOR
BATT.
L1
wide band width
VMPL mobile phone link
1530
510R1
SAT" LINK
1532A
1532B
1532C
MPL1 mobile phone link
ENSOR A 1530A
ENSOR B 1530B
ENSOR C 1530C
1522

FIGURE 17

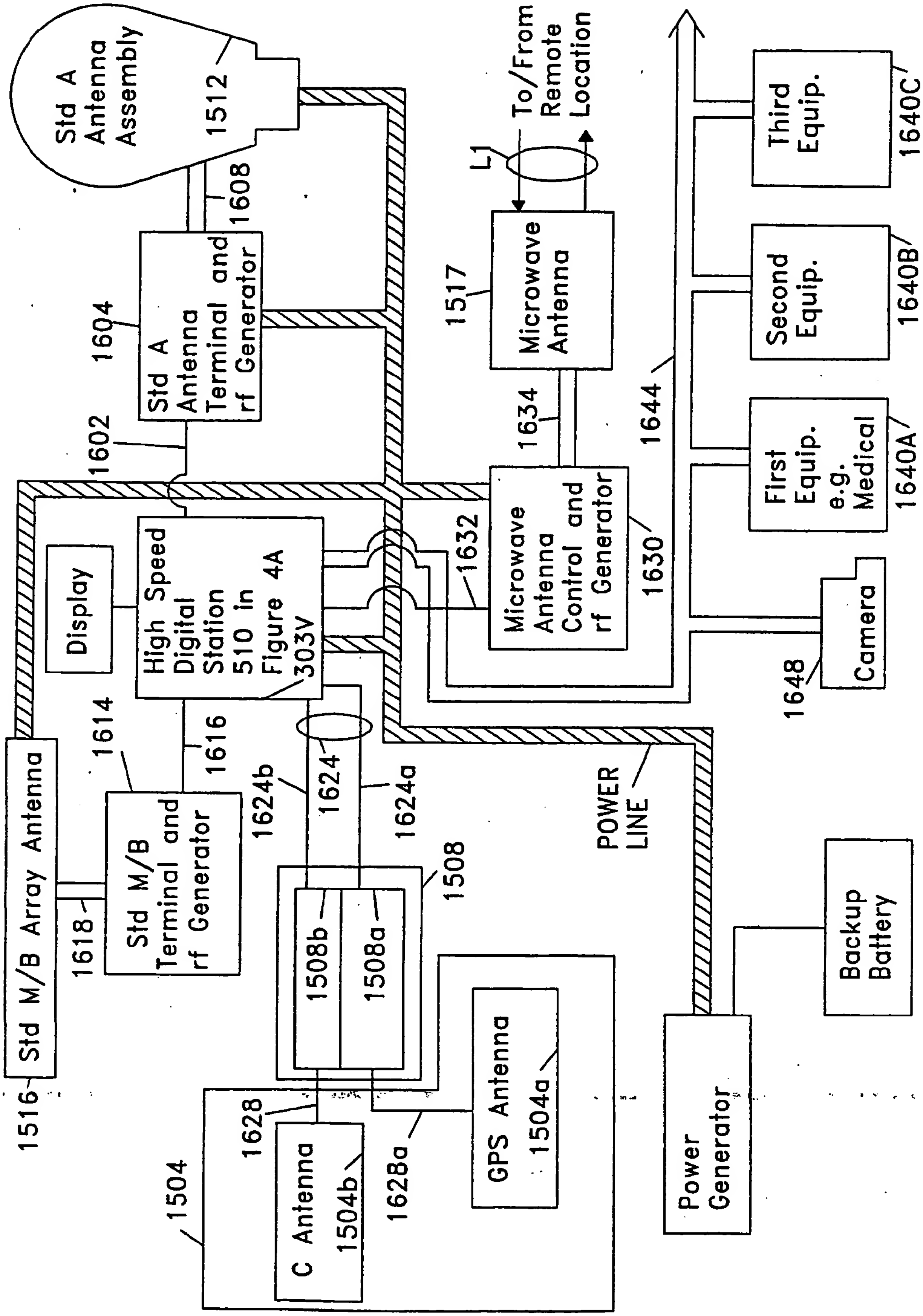

Std A Antenna Assembly
1512
1608
1604
Std A Antenna Terminal and rf Generator
1602
To/From Remote Location
L1
1517
Microwave Antenna
1634
1644
Third Equip.
1640C
Second Equip.
1640B
First Equip. e.g. Medical
1640A
Microwave Antenna Control and rf Generator
1630
1632
Display
High Speed Digital Station 510 in Figure 4A
303V
Camera
1648
1614
1616
1624
1624b
1624a
Std M/B Array Antenna
Std M/B Terminal and rf Generator
1618
1508
1508b
1508a
POWER LINE
Backup Battery
Power Generator
GPS Antenna
1504a
1628
1628a
C Antenna
1504b
1504
1516

FIGURE 18

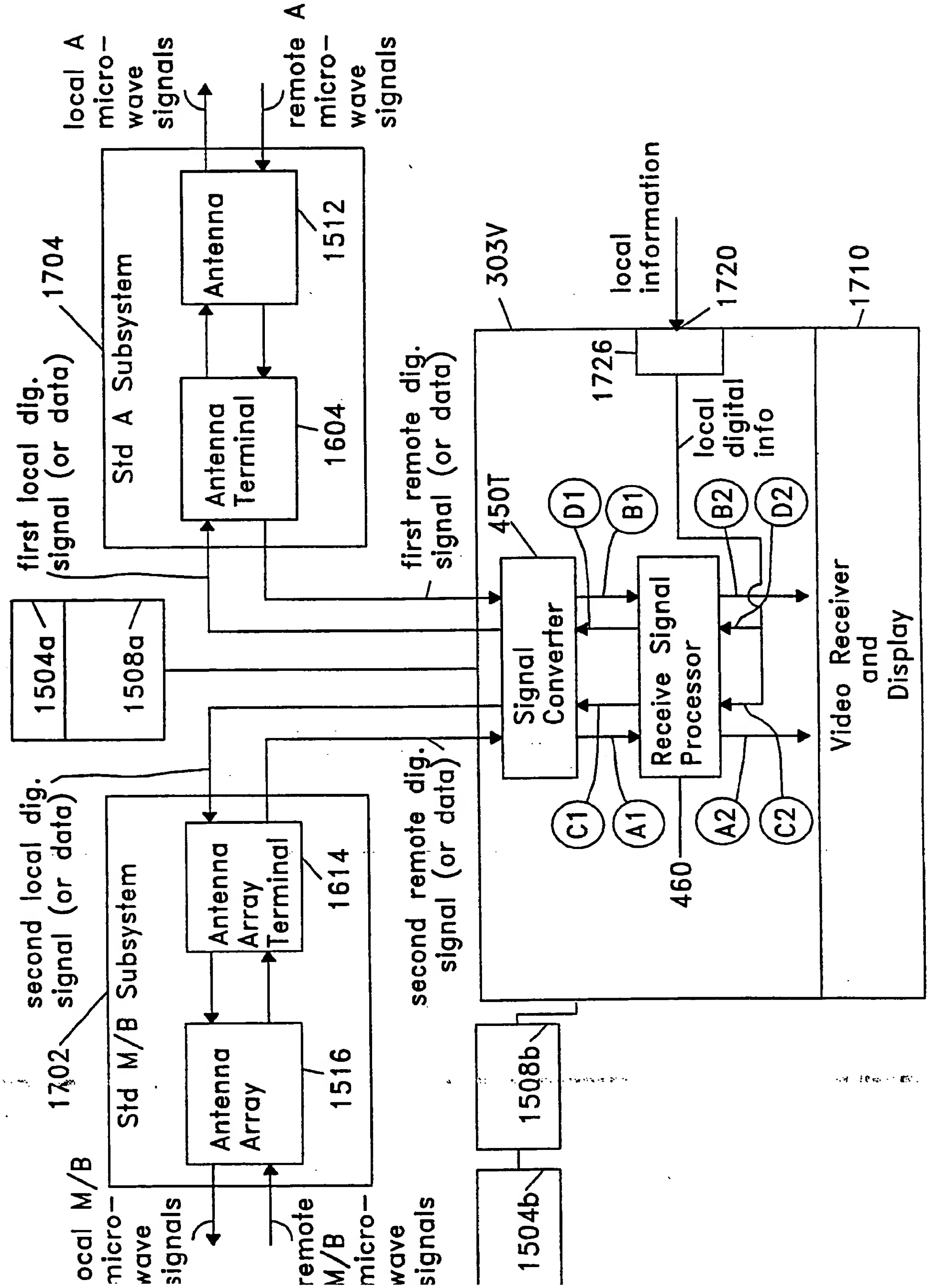

local A micro-wave signals
remote A micro-wave signals
Std A Subsystem
1704
Antenna
1512
Antenna Terminal
1604
first local dig. signal (or data)
first remote dig. signal (or data)
303V
local information
1720
1710
1726
local digital info
450T
D1
B1
B2
D2
Signal Converter
Receive Signal Processor
Video Receiver and Display
1504a
1508a
C1
A1
A2
C2
460
second local dig. signal (or data)
second remote dig. signal (or data)
Std M/B Subsystem
1702
Antenna Array Terminal
1614
Antenna Array
1516
1508b
1504b
local M/B micro-wave signals
remote M/B micro-wave signals

FIGURE 19

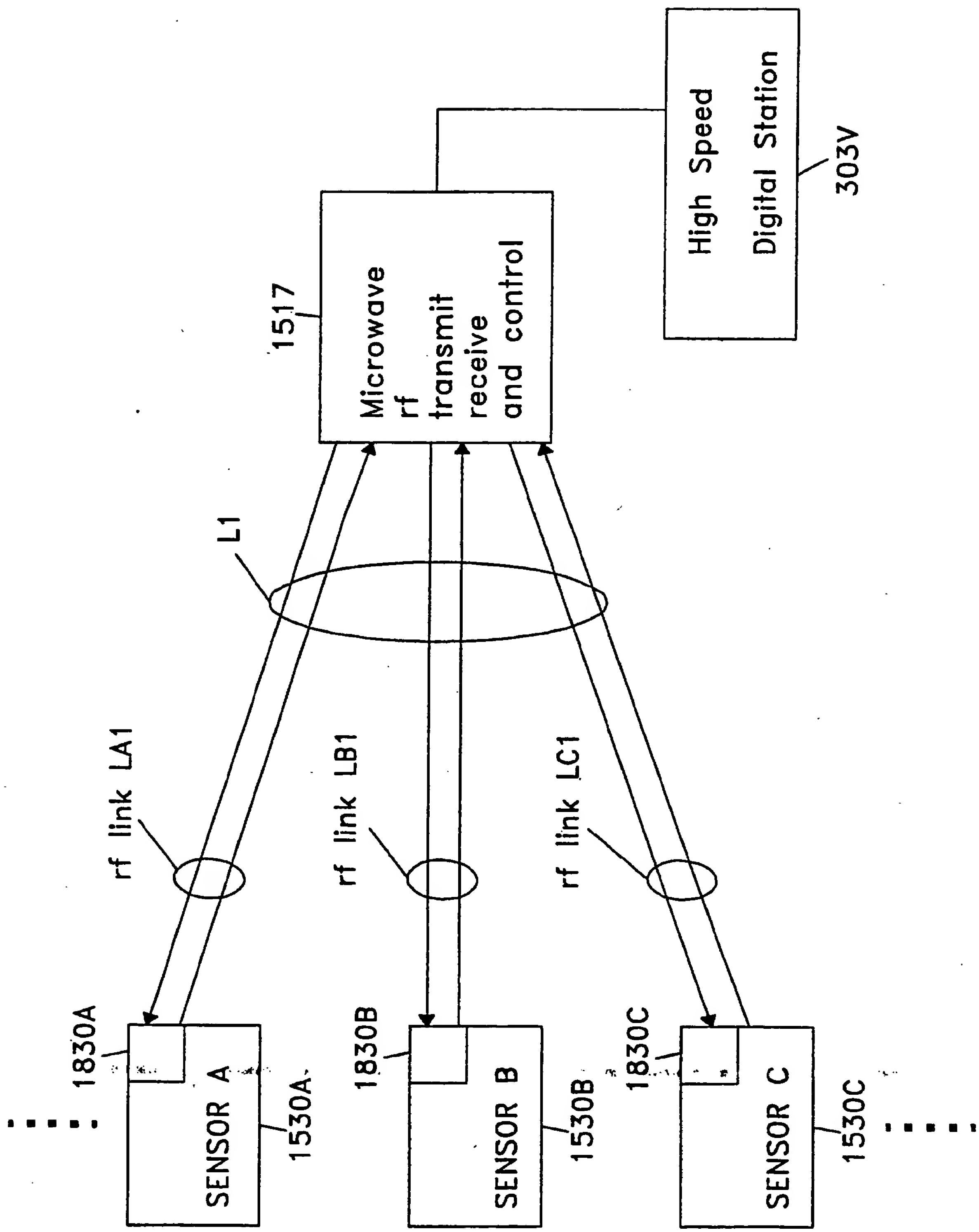

High Speed Digital Station
303V
1517
Microwave rf transmit receive and control
L1
rf link LA1
rf link LB1
rf link LC1
1830A
1830B
1830C
SENSOR A
SENSOR B
SENSOR C
1530A
1530B
1530C

FIGURE 20

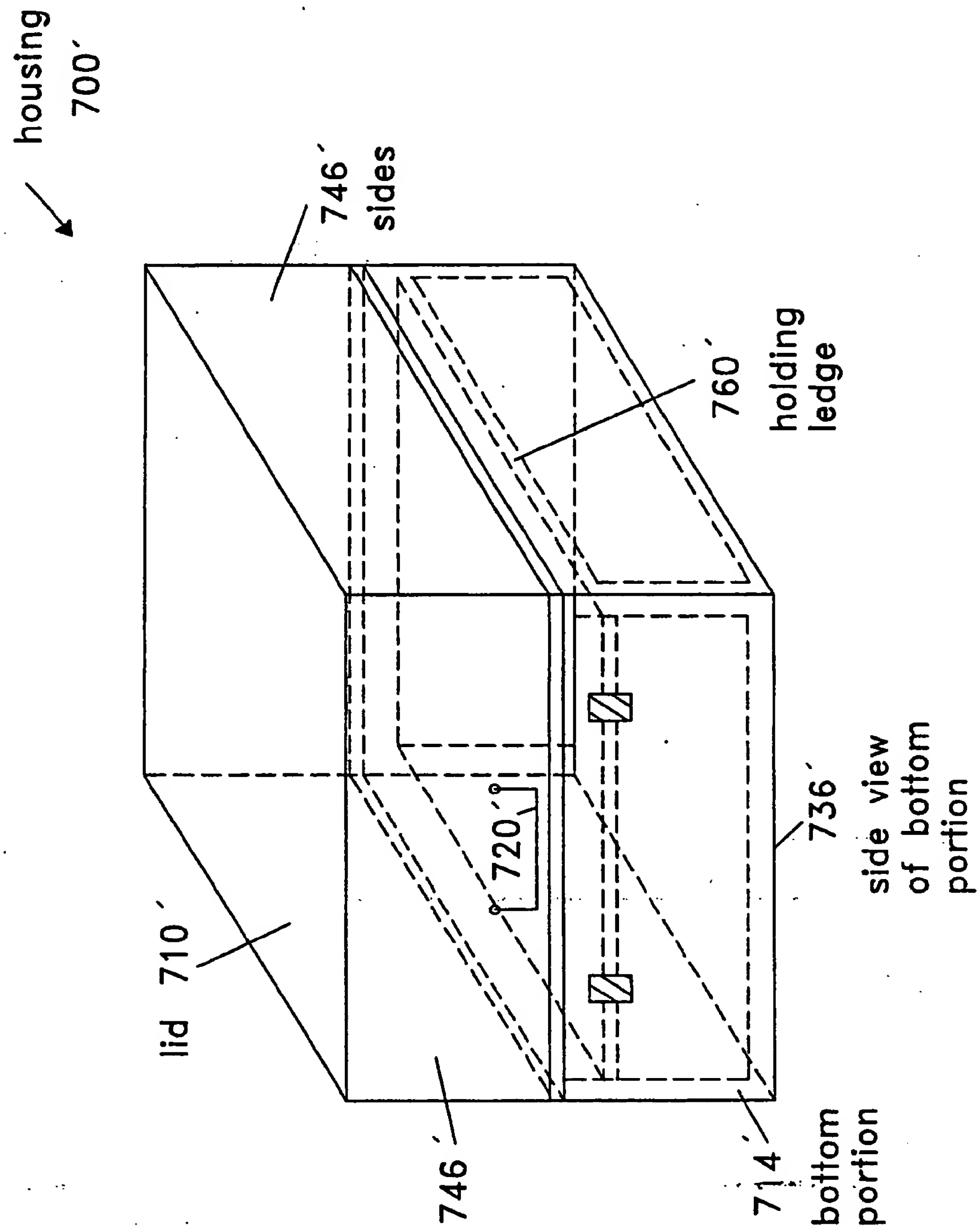

housing 700´
746´ sides
760´ holding ledge
lid 710´
720´
736´ side view of bottom portion
746´
714´ bottom portion

Figure 21A

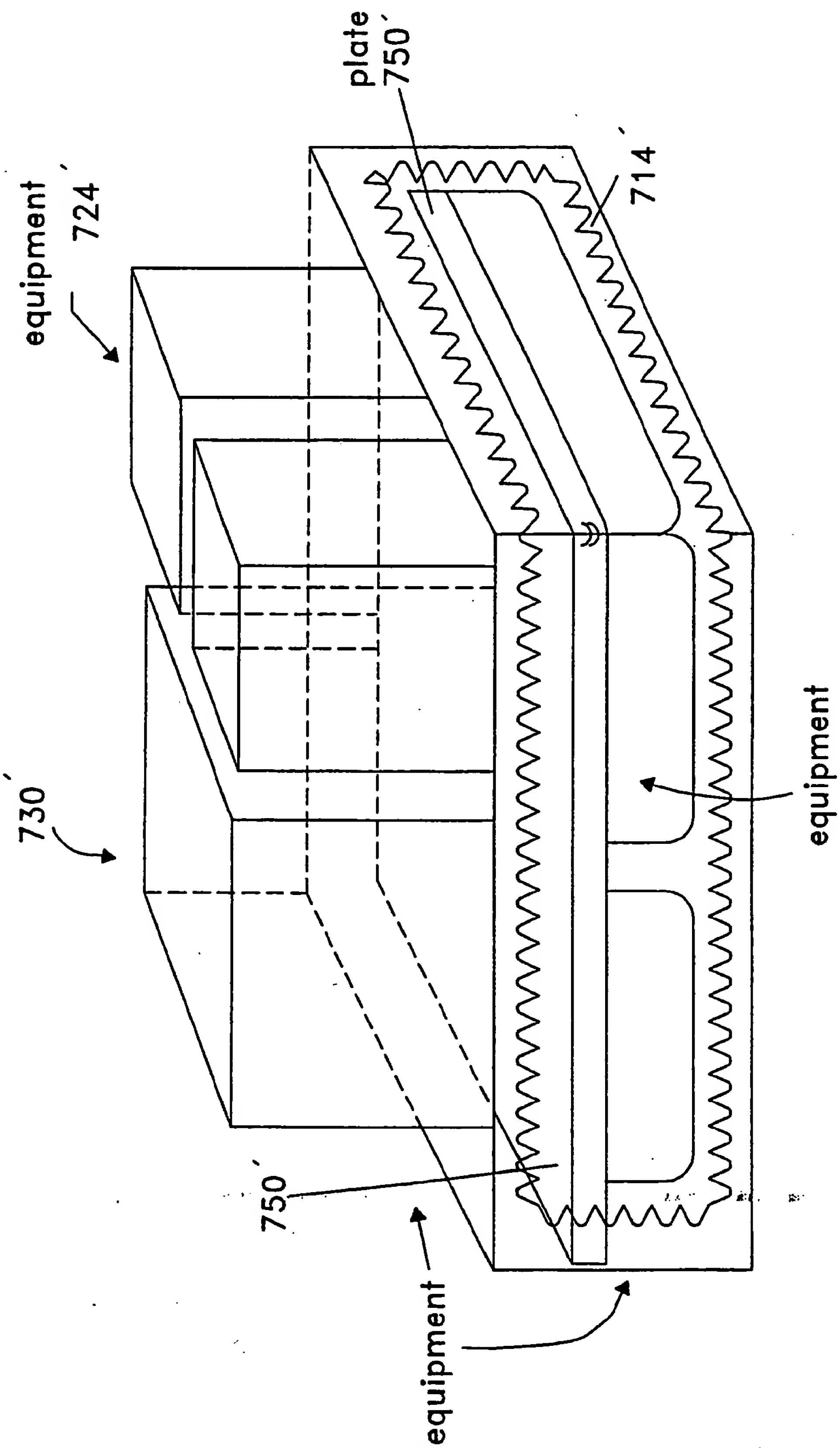


Figure 21B

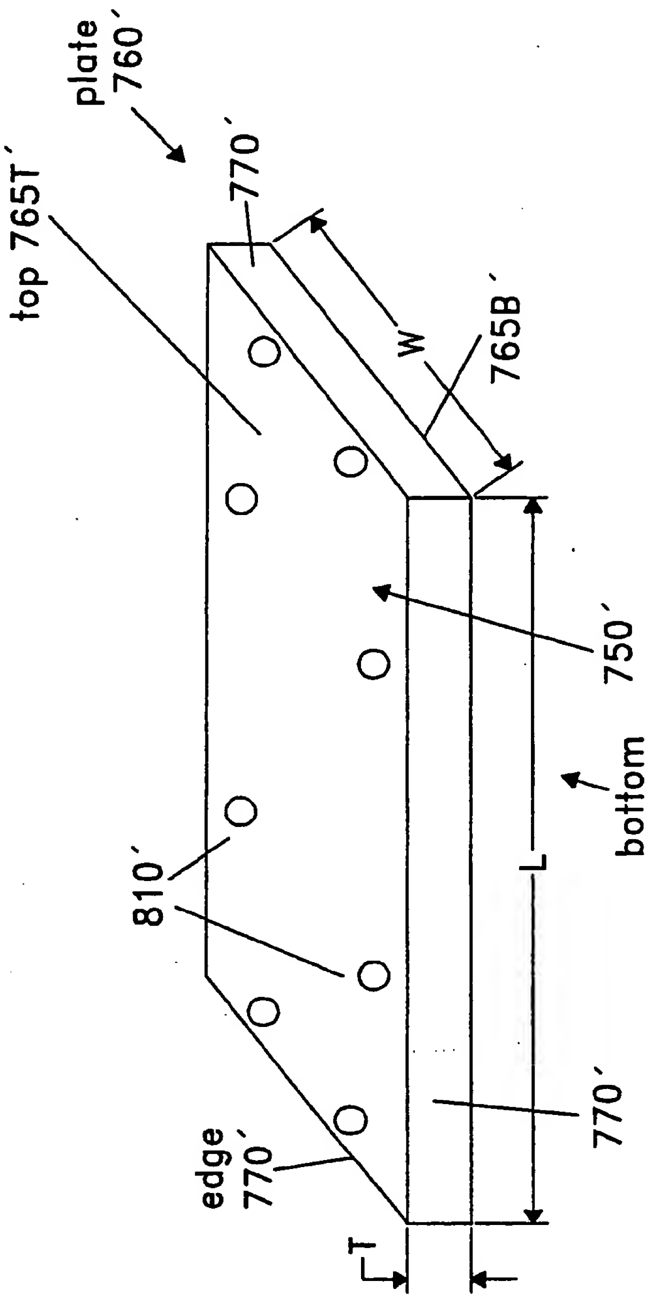


Figure 22A

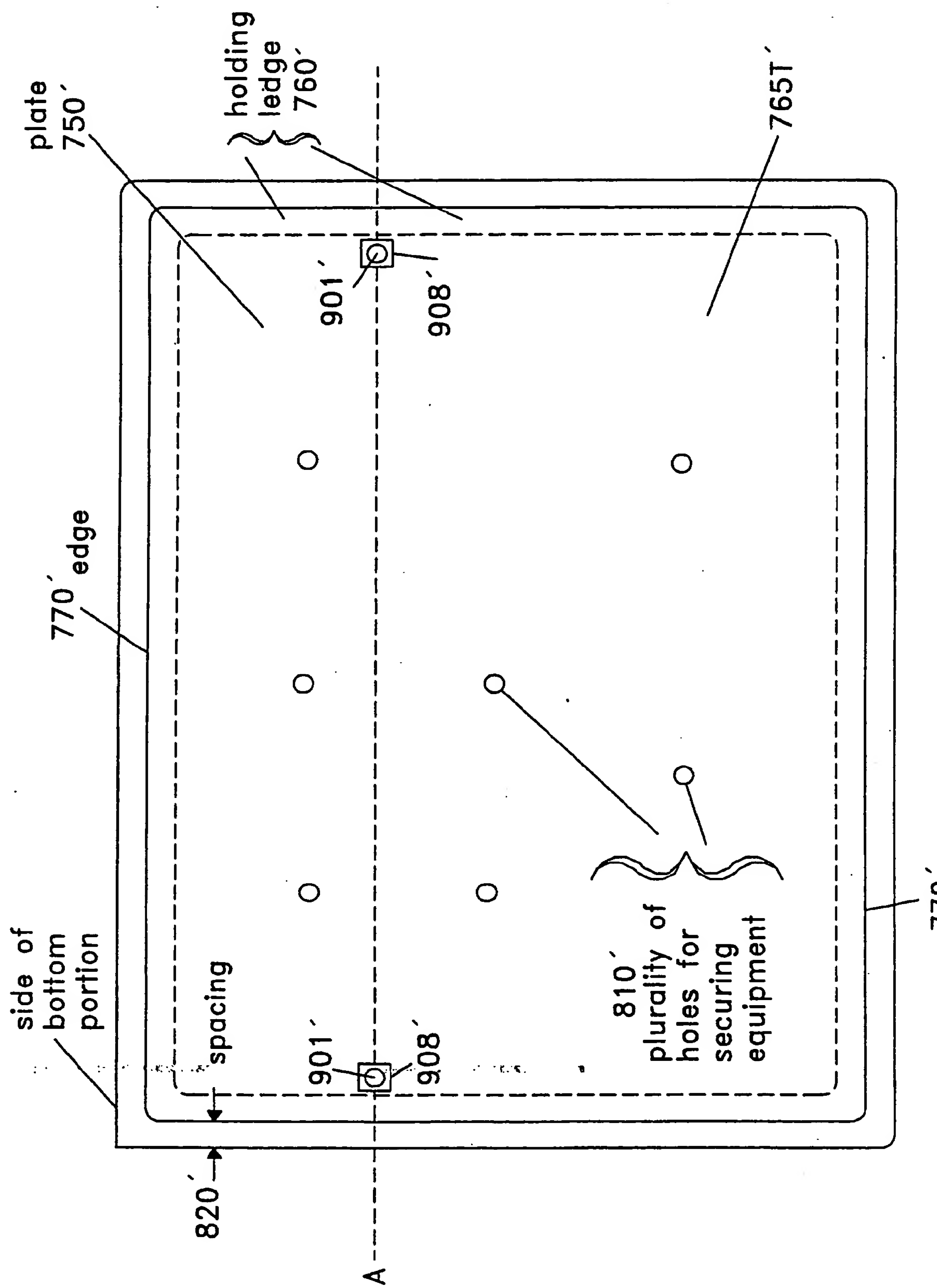


plate 750'
holding ledge 760'
765T'
901'
908'
770' edge
770'
side of bottom portion
spacing
901'
908'
810' plurality of holes for securing equipment
820'
A

Figure 22B

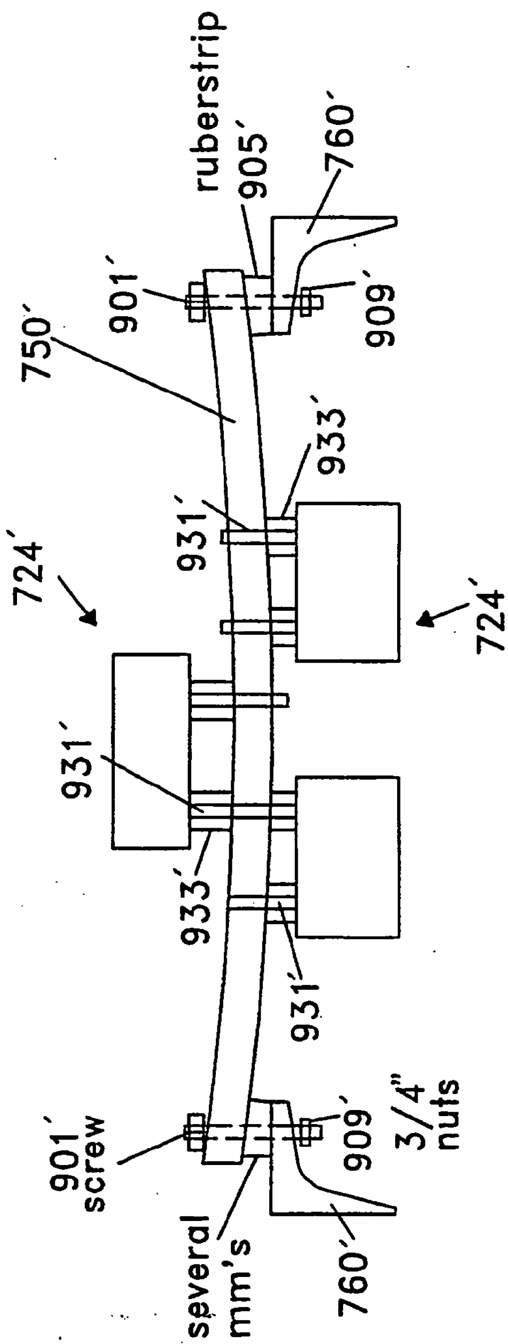

ruberstrip
905´
760´
901´
909´
750´
933´
931´
724´
724´
931´
933´
931´
901´ screw
909´
3/4" nuts
several mm's
760´

Figure 23

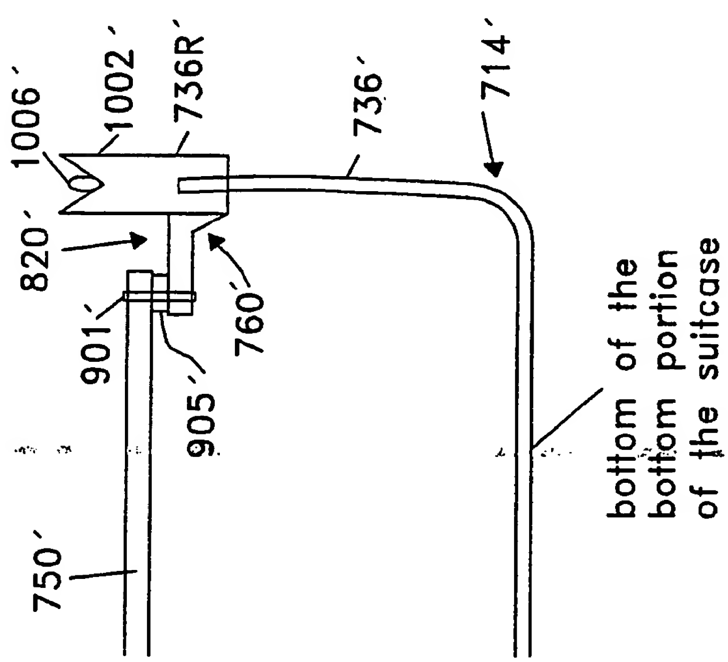


Figure 24

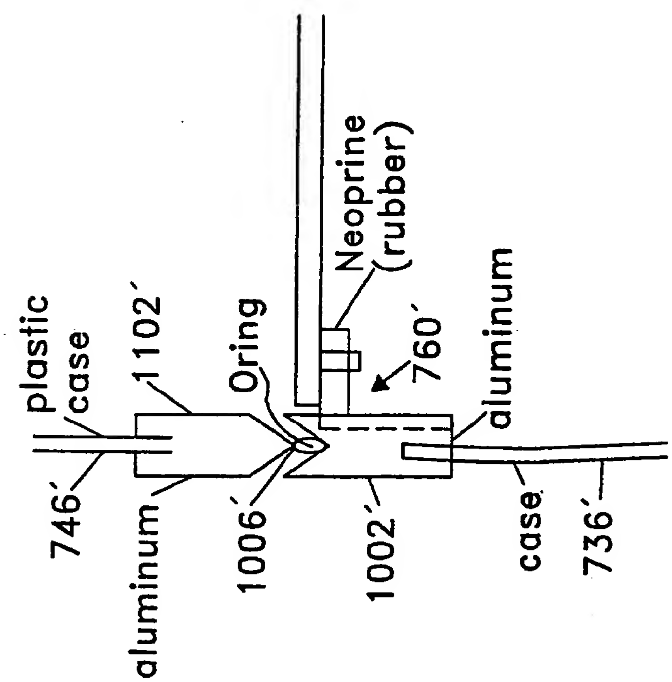


Figure 25

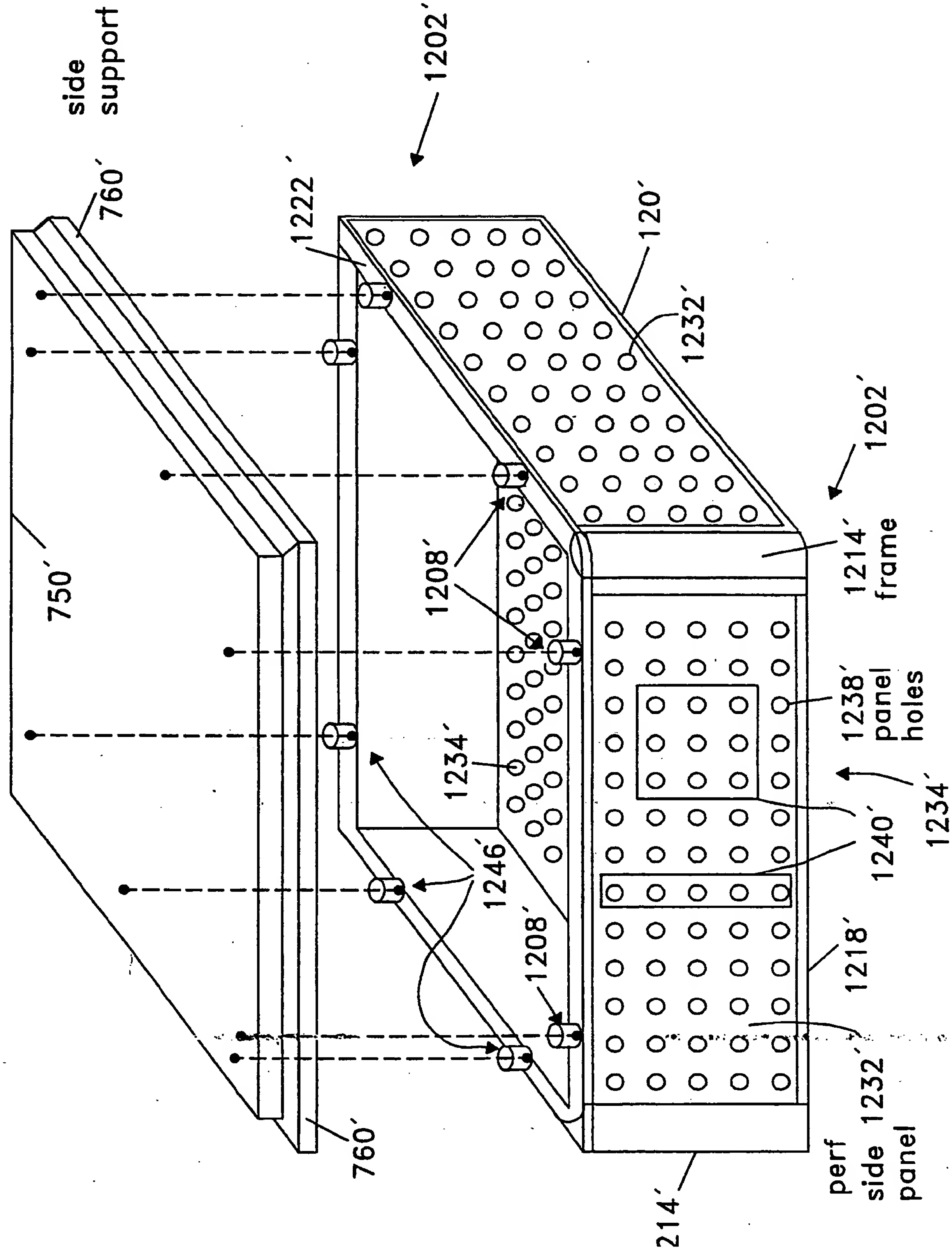

side support
1202'
760'
1222'
120'
1232'
750'
1202'
1208'
1214' frame
1234'
1238' panel holes
1234'
1240'
1246'
1208'
1218'
1232'
760'
214'
perf side panel

Figure 26A

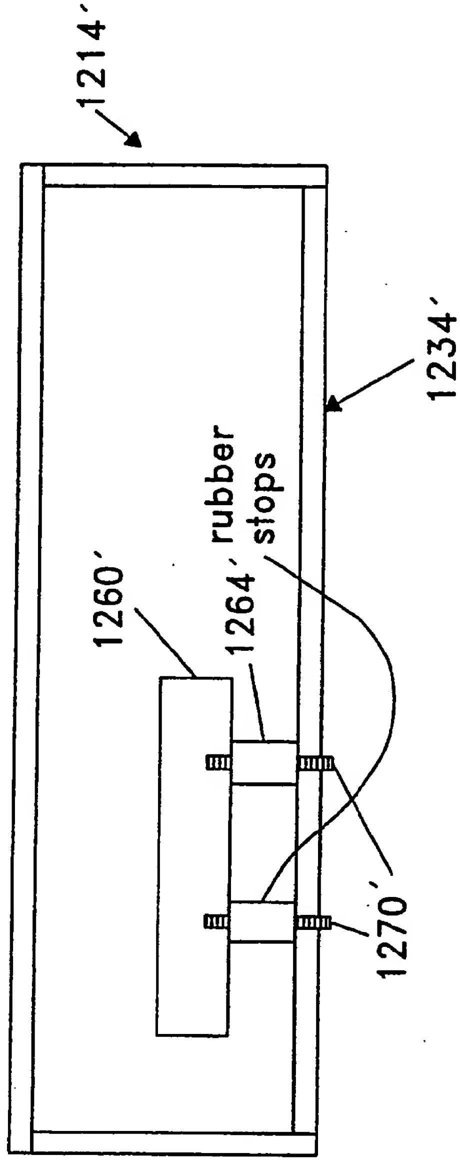


Figure 26B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/03899

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :Please See Extra Sheet.
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, search terms: compression, teleconference, GPS, microwave, multiplex, distribution.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,132,992 (YURT et al) 21 June 1992, Figure 1c, 2a, 2b, 6, column 2, line 25 to column 3, line 15.	1-46, 59-61, 100-103, 109-111, 112-115.
A,P	US, A, 5,331,672 (EVANS ET AL) 19 JULY 1994	13, 14, 24, 25.
A	US, A, 4,748,638 (FRIEDMAN ET AL) 31 MAY 1988.	1-46, 59-61, 100-03, 109-111, 114, 115.
Y, E	US, A, 5,333,155 (DAMBACHER) 26 JULY 1994, ABSTRACT, FIGURE 2.	47-58
Y, E	US, A, 5,319,682 (CLARK), 07 JUNE 1994, FIGURE 1.	47-58

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be part of particular relevance

"E" earlier document published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 AUGUST 1994	SEP 08 1994
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer AMANDA LE Telephone No. (703) 305-4760

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/03899

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,146,324 (MILLER ET AL) 08 SEPTEMBER 1992, FIGURE 1.	1-61.
A	US, A, 5,133,079 (BALLANTYNE ET AL) 21 JULY 1992	62-76
A	US, A, 5,249,043 (GRANDMOUGIN) 28 SEPTEMBER 1993.	62-76
Y	US, A, 4,777,633 (FLETCHER ET AL) 11 OCTOBER 1988, FIGURE 1.	57, 58
Y, P	US, A, 5,287,351 (WALL JR) 15 FEBRUARY 1994, FIGURE 1, 2	57, 58
A	US, A, 5,157,491 (KASSATLY) 20 OCTOBER 1992	47-58
A,P	US, A, 5,237,561 (PYHALAMMI) 17 AUGUST 1993	62-76
Y, E	US, A, 5,303,393 (NOREEN ET AL) 12 APRIL 1994, FIGURE 2, 3E, 4.	77-98
Y	US, A, 5,004,105 (FREADMAN) 02 APRIL 1991, FIGURE 1, 3, COLUMN 1-3.	99-121
A	US, A, 5,161,255 (TSUCHIYA) 03 NOVEMBER 1992.	4, 41, 48, 53.
A,P	US, A, 5,235,822 (LEONOVICH JR.) 17 AUGUST 1993	99-121